JANUARY 1972

WEEDS TREES and TURF

MULTI-LAND USE
SPRAY NOZZLES
WEED CONTROL EFFECTS

Dacthal®... drives crabgrass and Poa annua off the course.

Dacthal preemergence herbicide drives out over 20 annual grassy and broadleaf invaders, including crabgrass and *Poa annua*. It *prevents* weeds—kills the seeds as they germinate.

One application in early spring controls most problem weeds. Spray Dacthal W-75 wettable powder. Or, spread convenient G-5 granules. Either method does the job. Just read and follow label directions.

Dacthal won't leach out with frequent waterings. Yet, it degrades in one season ...is *not* persistent in the soil!

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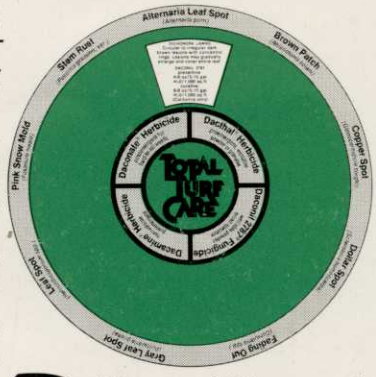

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A UNIT OF DIAMOND SHAMROCK CORPORATION

FREE! WTT-1

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Diamond Shamrock Chemical Company
300 Union Commerce Building
Cleveland, Ohio 44115

Gentlemen:
Please send me_____Total Turf Care dials.

Name_____

Position_____

Street or PO Box_____

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For More Details Circle (106) on Reply Card

WEEDS TREES and TURF®

Volume 11, No. 1 **January, 1972**

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Integrated Land Development **8**

How the recipe for success in Florida combines golf courses, water, housing, hotels and green areas into multiple land use.

Nozzles and Spray Systems **10**

An analysis of nozzles and nozzle materials by Donald R. Weber, Spraying Systems Company.

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Quality sod produced as rapidly and as efficiently as possible are the objectives of the sod producer reports Richard E. Schmidt, associate professor of agronomy, Virginia Polytechnic Institute.

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The Cover

Arvida Corporation, a land development firm headquartered in Miami, has developed 34,000 acres of Southeastern Florida into a beautiful example of multiple land use. Our cover represents the integration of water systems, trees, fairways, blue skies and Florida sunshine.

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On the Safety and Health Act of 1970

Sen. Harrison A. Williams, Jr. (Dem.-N.J.) and Rep. William A. Steiger (Rep.-Wisc.) have stitched together a new green flag with a white cross. Called the Williams-Steiger Occupational Safety and Health Act of 1970, this flag is currently waving a Federal safety signal in every state of the nation.

The act authorizes the Department of Labor to set and enforce occupational safety and health standards for businesses engaged in interstate commerce. This includes farmers and small businessmen who employ help, even those with only one employee. Four sets of safety standards for agriculture are embodied by the law. Two specifications went into effect last August 27, one for the design, application and use of the slow moving vehicle emblem and the other for the construction and maintenance of temporary labor camps. Two additional standards involving the pulpwood timber industry and the use, handling and storage of anhydrous ammonia will become effective this February.

The teeth to this law are sharp. Admittedly, it places a burden on the employer to keep additional records detailing each occupational injury and illness on employees. Enforcement is through safety inspectors. The law permits them to enter all business establishments, large or small, to inspect structures, equipment, materials and to question privately the employer or any employee. We would predict that businesses involved in the handling, distribution and application of crop and turf protection chemicals will be among the first to be visited by inspectors.

Violators will be issued written citations and given a reasonable time to correct the situation. Accurate records are required on work-related deaths, injuries and illnesses. Employers may also be required to maintain records of employee exposures to potentially toxic materials.

Whether the law is good or bad is not the issue. Safety must be the watchword in every operation we undertake. Safety like a clean environment is not to be practiced by a few. Rather, it is the responsibility of every individual—employer and employee.

We in the green industry must adopt the green flag of safety as our standard. The Occupational Safety and Health Act only establishes Government's authority to insure safety. The real responsibility rests with each of us.

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This new, Super-Lightweight will amaze you! The STIHL 020 AV

Here it is! New and terrific!

The finest and the most advanced mini-size lightweight saw in the World... designed and engineered for you by STIHL, makers of the World's First and Finest Chain Saws.

It's the first and only chain saw of its size in the World with built-in shock absorbers and automatic chain oiling. Yes, now you can have the same famous patented STIHL AV anti-vibration system & superior quality and performance, formerly only available in our higher priced professional models.

A small beauty, that weighs less than 10 lbs. with bar & chain. Its amazing power and long, trouble-free operation, without overheating, makes it perfect for pruning, limbing and felling.

So... Don't Settle for Less than the Best. Insist on STIHL! Like the terrific new STIHL 020 AV!

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THE ACKLEY HYDRAULIC PISTOL GRIP CHAIN SAW

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So light, so well balanced, so easy to maneuver . . . every trimming job goes faster with the Ackley Pistol Grip Hydraulic Chain Saw. Powered by the HYREVZ hydraulic motor it zips through limbs and trees big and small hour after hour with never a miss or sputter. Quiet too . . . much, much quieter.

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Also available in a long handle (up to 5') model with hi-dialectric epoxy.

Write for Free literature on all Ackley tools, air and hydraulic, that can help you get the job done with less cost at every turn.

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TURF IMPORTANT TO ATHLETIC PROGRAM

In the past three months your magazine has published two articles on football field maintenance by Dr. W. H. Daniel and myself. I would like to take this opportunity to personally thank you and your magazine for publishing these articles.

As an exponent of natural grass for athletic fields, I feel that the responsibility lies with the turfgrass people to show that the artificial turf is not always the best answer for football fields . . . MELVIN J. ROBEY, Superintendent of Athletic Facilities, Purdue University, Lafayette, Ind.

MORE INTEREST IN SPORT TURF

I continue to receive your excellent magazine, and enjoy reading several of the features each month. On pages 26 and 27 of your November issue is a very fine feature concerning athletic field maintenance. I wish I could get this article into the hands of about twenty persons in Monroe County, Michigan who have charge of our various athletic fields . . . EDGAR C. KIDD extension agricultural agent, Monroe, Michigan.

TREE INJECTION CRITICISM

I have just finished reading the latest issue of your excellent publication. I always enjoy the factual information given in the articles you print.

This time, however, I must take exception to the article: The Widening Potential of Tree Injection . . . Although the article is well-written, and contains a lot of information for those not familiar with the process, it is misleading in creating the impression that this method is a cure-all for all types of trees. This is definitely not the case . . . Apparently the translocating ability of trees differs with species, and some, such as fruit trees do very well, but some like oak do very poorly. This phenomena was substantiated by several researchers at U.C. Berkeley. Consequently, the statement that tree injection works for all trees would seem to be falacious, and should be qualified. Y. LEE HUANG, greens superintendent, Walnut Creek Golf Course, Walnut Creek, Calif.

REPRINTS? YES

I want to convey the sincere appreciation of the administration and faculty of our school in the spread . . . of our new Recreational Grounds Management curriculm.

May we have permission to make reprints of the page for use in student recruitment for the coming year . . . You may also be interested to know that two of the students in the picture, Mr. Avery and Mr. Hollar, have just been notified that they are recipients of scholarships from the Golf Course Superintendents Association of America. WILLIAM S. STOKES, Community Services Officer, Catawba Valley Technical Institute, Hickory, N. C.

INSPECTED SEED

The October 1971 article, "Turfgrass Seed and Fertilizer Bidding Specifications," by William E. Knoop, posed the question — "How to be sure the seed obtained is indeed the mixture ordered." He suggested the grass varieties should be purchased separately and then mix them yourself.

. . . the New Jersey Department of Agriculture offers a service to prospective purchasers of grass seed mixtures which will assure him that the mixture obtained is the mixture ordered . . . ROY M. ATKINSON, Chief, Bureau of Seed Certification, Department of Agriculture, Trenton, N. J.

ANYTIME

Our agency has subscribed to your publication for several years and we are in the process of publishing a monthly news letter for some of the aerial applicators whose insurance we write.

I was wondering about copying an article from time to time from your magazine which would be of interest to these insureds. For instance, the article on Herbicide Safety in your November 1971 issue. We would, of course, give full credit to your magazine and to the writer of the particular article. . . ART EVERETT Little Rock, Arkansas.

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Government News / Business

Nurserymen Discuss Border Quarantine Developing uniform quarantines and regulations to make a freer exchange of plant materials between the U.S. and Canada may soon be possible. Twenty officials representing both governments, U.S. nurserymen and the nursery industry in Canada met recently to discuss the situation. Five quarantines are now identical including: Japanese beetle, European chafer, Cereal leaf beetle, gypsy moth, and European marsh crane fly. Agreed at the confab that trade associations of each nation will keep each other informed of any changes in quarantines and regulations.

More Dollars For Highways That's the report from the Department of Transportation's Federal Highway Administration. They estimate that $21.8 billion will be available in 1972 for Federal, State and local governments.

EPA Okays Insecticide Product Prentiss Drug & Chemical Co., Inc. has announced registration by Environmental Protection Agency of Prentox intermediate DPB-1000. The concentrate contains Diazinon and synergized pyrethrins. It will be further formulated for the preparation of a finished insecticide.

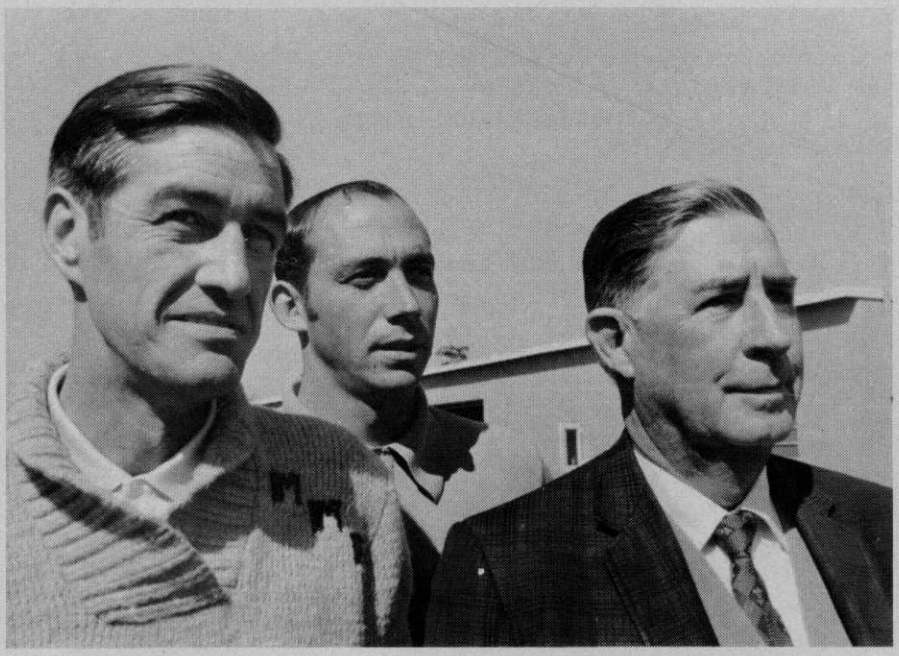
Dollar Devaluation U.S. small business will be little affected by the President's announcement of the devalued dollar, say economists. Japanese and European import prices will register a change. U.S. investors in foreign markets will benefit most; foreign business in the U.S. will be hardest hit.

Auto Excise Tax Refund As suspected, the 1971 Revenue Act, now law, repealed the 7 percent excise tax on new cars and trucks weighing up to 10,000 pounds. Made it retroactive to August 16. Customer's refund checks will be mailed early this year.

Ruckelshaus On Eutrophication The EPA administrator in a recent House committee hearing pointed to $12 billion included in the February '71 Nixon program to achieve clean water. "If it appears, Ruckelshaus said, "that phosphorus control measures might be effective, we will work out the remedial action which will be necessary in conjunction with the state and localities involved." He further said that the Refuse Act permit program will be used to deal with industries; and where municipal waste treatment plants are involved, grant funds will be used to assist in construction of remedial facilities.

THE GREEN INDUSTRY AT WORK

Integrated Land Development



Top: Arvida Corporation's major resort hotel complex is the Boca Raton Hotel and Club. With the completion in late 1969 of the 26-story guest room tower, the hotel can accommodate 1,500 guests daily. Pictured above are, from left: Mac Parsons, superintendent of the two Hotel courses; W. H. Wright, superintendent of the two Boca Raton West courses; and C. C. Shaw, Arvida vice-president for golf course development.

INTEGRATED LAND DEVELOPMENT, is the fashionable phrase. Add a few million dollars to a planner's dream and you can build a beautiful tropical atmosphere for living.

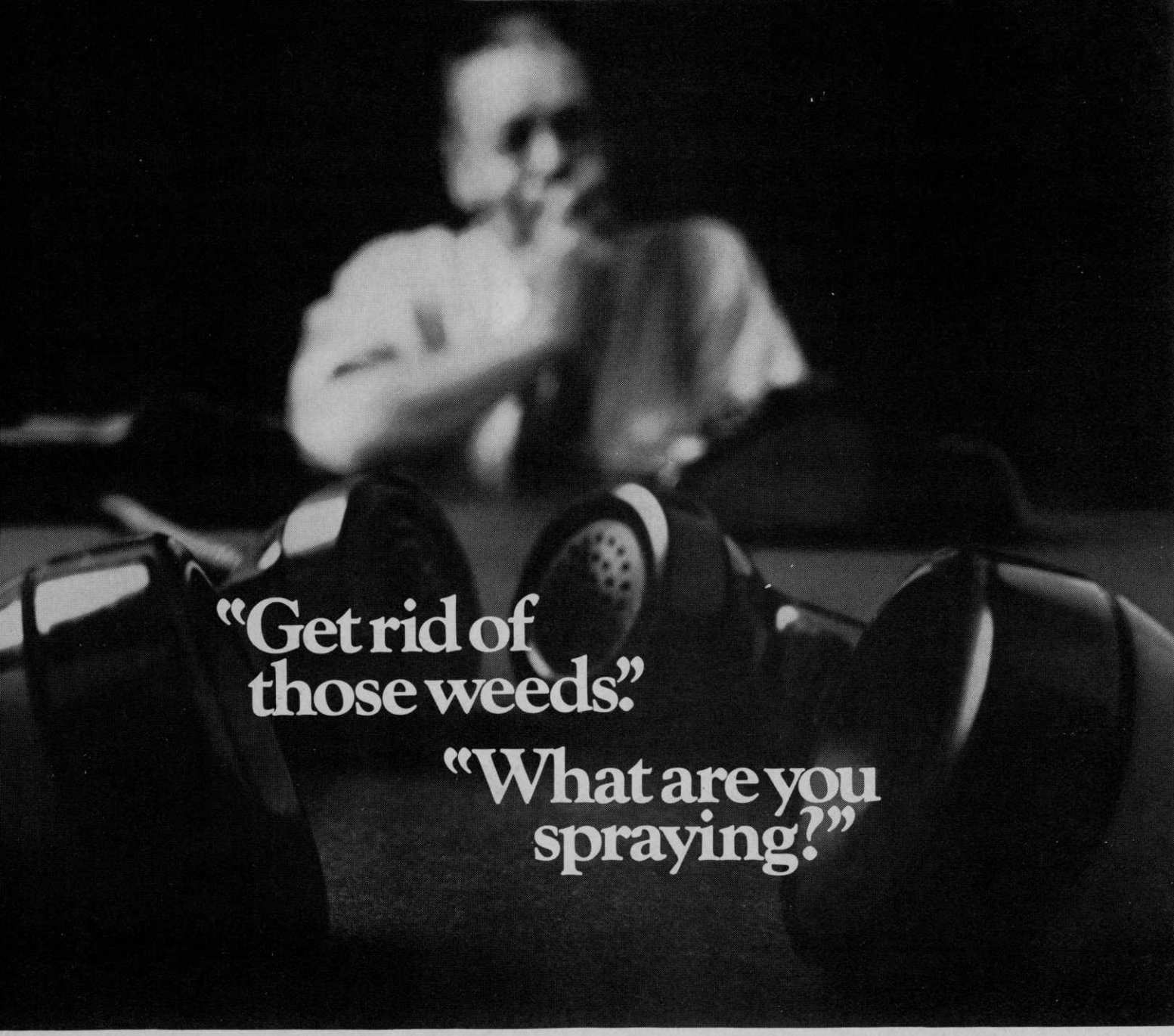
But who keeps the dream looking beautiful year after year?

What system of landscape maintenance works? Should services be hired, or should a staff be maintained? Should the staff have central direction, or should specialists tailored to a particular job be allowed to function independently?

Probably every combination has been tried, and many have worked. Nevertheless, it is interesting to examine how one large Florida corporation is taking care of its own landscape maintenance.

Arvida Corporation, a multi-million-dollar land development firm headquartered in Miami, inherited part of its system. Another part evolved from practical experience, and modifications stemmed from good business sense.

(continued on page 18)



Geigy herbicides can satisfy both sides.

It's tough being the man in the middle when you're armed only with excuses.

Geigy herbicides give you something better. Answers.

Answers to all kinds of weed and vegetation management problems.

Answers that should satisfy both sides: Those concerned about stopping weed pollution, and those concerned about what you're spraying.

How? After Geigy herbicides do their job, nature breaks them down. This helps you enhance the environment without injuring it. Which makes your job easier. And more satisfying.

You've got AAtrex®, Princep®, Atratol® and Pramitol® to choose from. In wettable powder, emulsifiable, pelleted and granular forms. Each is suitable for various jobs and conditions. But all give long-term, effective performance. Singly or as the foundation for combinations of chemicals.

So if you'd like help in planning a vegetation management program that gives you answers, not excuses, please send this coupon to: The Industrial Weed Control Department, Geigy Agricultural Chemicals, Division of CIBA-GEIGY Corporation, Saw Mill River Road, Ardsley, New York 10502.

Name _____

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Company _____

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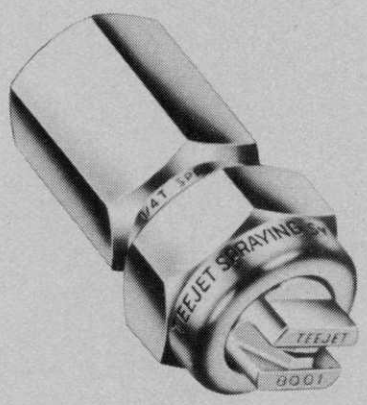
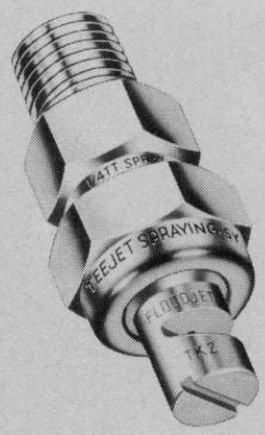
Nozzles And Spray Systems

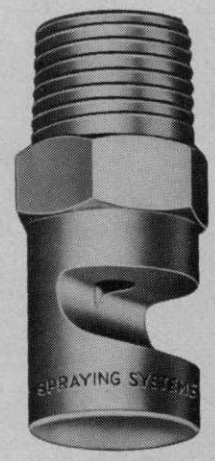
By Donald R. Weber, Spraying Systems Company, Bellwood, Ill.



Type ¼ T Teejet nozzle with flat spray tip.



Type ¼ TTK Teejet nozzle with Floodjet tip.



Type K Floodjet nozzle.

Before delving into the nozzle varieties available and their usage, there are some physical attributes that ought to be considered. Just how accurate should one expect a nozzle to be at the time of purchase, and how long should this accuracy remain?

We feel that if we can manufacture an orifice with a tolerance of plus zero, minus 0.00″ to 0.002″ we will be able to deliver to the customer a nozzle that will meet his specifications as to gallonage, spray angle, distribution of liquid throughout the spray angle, proper particle size and particle size distribution, and from a good to a long performance life depending upon the conditions under which the nozzle is used. The reason for slightly undersizing the orifice is to give an extended wear life to it. However, if it is made too small, then the desired spray characteristics will be altered.

In order to have a rough gauge of comparison, here are results of accelerated erosion tests. The conditions of the test were: 1) finely ground quartz suspended in water under continuous agitation; 2) identical different materials; 3) all orifices mounted on the same header; 4) the header fed from more than one location if necessary; 5) pressure held to a constant reading; 6) all orifices tested the identical length of time under the identical conditions.

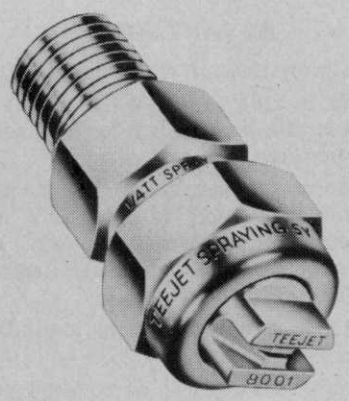
Unless such conditions are used and met, results will be incorrectly interpreted and reported. Repeated tests of orifices and nozzles showed the following relationships to be consistent: Using brass as a base and giving it a life of one (1), whether it be minute, hour, day, week, etc. we have:

Material	Life
Plastic	½ to 1
Aluminum or brass	1
Stainless Steel	3.5
Hardened Stainless Steel	10 to 15
Ceramic	90 to130
Tungsten Carbide	180 to 250

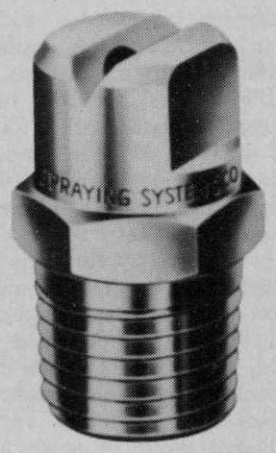
While one plastic orifice did give an extended life, it was due to a small skin burr around the orifice that tended to flap back and forth without wearing off, thus interfer- not increasing the wear life. Upon removing this flap from other identical orifices, we found that it did not wit..stand erosion any better than orifices made from other plastics. Flow rates were inconsistent with those marked on the orifice.

There are a multitude of grades of ceramic. Some are good, all are extremely brittle, and all have been inaccurate so far. Most are placed in a brass holder that does not stand up under certain chemicals, and if cemented into stainless steel holders, some chemicals attack the cement and the tip falls out. So far it has been the brittleness and inaccuracy that has defeated these tips.

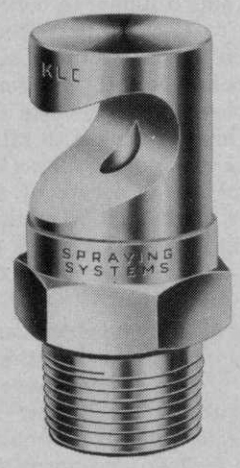
PLASTIC orifices, depending upon the material from which they are made, can vary due to absorption of liquid or loss of moisture. They are made by molding over a pin. Shrinkage must be considered in this molding process, because these pieces are literally knocked out of the molds and ejected from the orifice core pins by the t..ousands. Orifice sizes will vary due to the mold, tically matched orifices, except in



Type ¼ TT Teejet nozzle with flat spray tip.



Type H ¼ U Veejet nozzle.



Type KLC Fieldjet nozzle.

mold temperature, mold pressure, molding time, the plastic used, the plastic temperature, the skill of the operator or the skill of the set-up man. Accuracy is not one of the strong points of this type of orifice in a production run due to the aforementioned variables. Machining plastic would improve the accuracy, but results in fibers and burrs in the orifice that would require hand deburring at a great expense and possible distortion of the spray.

BRASS AND ALUMINUM are easily machined, can be made to almost any tolerance desired if the proper equipment is available, will withstand most of the ordinary agricultural chemicals used in weed and pest control, and are readily available. Aluminum does have the tendency to gall and to wire draw if hurried through the machining process. If threaded and joined aluminum to aluminum, then a lubricant, such as molybdenum disulphide is suggested so that the parts ring with the spray pattern, but may be disassembled at a future time.

STAINLESS STEEL orifices are punched, drilled or machined, depending upon the type being produced. If punched, then one must expect dulled or broken punches which will produce irregular or oversized orifices, resulting in greater capacities than those indicated on the nozzle. In addition, ridges and burrs can be found within the orifice as well as on either side of it that will interfere with the flow characteristics of the liquid and the nozzle capacity. If machined to tolerances, then the only care to be taken concerns the fibrous nature of stainless steel itself. Minute burrs or fibers can be pulled into the orifice by the dragging action caused by the drill, or cutter in forming the orifice. This occurs when the machine is pushed for time on each tip and cannot properly do the work it should, or the tools are too dull.

HARDENED STAINLESS STEEL has the same problems as stainless steel, but a much tougher grade of stainless is used and it has a tendency to chip or break off pieces as it is machined. Furthermore, the stainless qualities can be lost or greatly reduced if the heat-treating process that hardens it is done incorrectly.

CERAMIC orifices are sensitive to chipping or crumbling when made, which will result in distorted spray patterns and flow rates due to the orifice irregularities. Among new orifices, whether molded or machined, a wide variation of flow rates is found among those orifices supposed to be of the same size. The normal orifice configuration requires an extreme control of dimensions and positions that ceramic fabrication methods cannot meet. Experimental tests with ceramics, as with plastics, have resulted in great variations in the orifices of a single batch, and even wider variations in batch to batch runs. Orifices can be individually tested, selected and matched, but that would defeat the low cost supposedly possible through their use. Ceramic technology is certainly well advanced for many items, but it has not gone far enough nor adequately enough for spray nozzle orifices.

TUNGSTEN CARBIDE orifices can be manufactured with great accuracy. The corrosion resistance to various chemicals is an unknown, and even greater variation can be expected when these chemicals are mixed with local water supplies. However, one could expect a long

life from these orifices due to erosive conditions that might be present, such as high pressure or entrained solids or both. Orifices of tungsten carbide are quite expensive when compared to brass or stainless steel, but if there is no violent corrosive condition present, and the erosive condition is not excessive, then one could expect the orifice to outlast the machine and still be accurate.

So far precision has been mentioned and alluded to without any figures to back it up. One way to approaching the problem in through your pocketbook. If you were spraying a chemical that costs $3.20 per gallon, and you were to mix it at a rate of 1 pint per 5 gallons of water, and apply it at a rate of 5 gallons per acre, then 1 gallon of the chemical could treat 8 acres at a chemical cost of 40 cents per acre, or $40.00 per hundred acres.

Some of the more unusual weed control applications in the central portion of the country have been:

Airplane or helicopter spraying under strict control conditions to prevent leakage and spray drift. An interesting application has been to control brush, followed by basal spot spraying from horseback to complete the kill.

Additional aerial spraying has been for brush control along power lines, pipe lines, railroad tracks, streams, etc. These are often followed in a few weeks by further application from ground driven equipment and handguns to complete the control program.

Railroad rights-of-way spraying is done either by the railroads themselves, or by contracting firms. The aim is bare ground on the ballast so that resiliency will be maintained. Decaying vegetation retains water and thus fosters compaction of the ballast. Large volumes of liquid are sprayed by tank trains moving at fairly rapid speeds. The desire is to have large drops and no drift, with complete coverage of the ballast.

Another area where complete vegetative control is desired is around, and upon, ammunition storage bunkers in the various arsenals. This is so that a grass fire will not set off the explosives. Standard weed control nozzles are used here, plus handguns to reach places where equipment is unable to enter.

We have varied an orifice for spot treatment of Johnson- or Bermudagrass clumps from a knapsack sprayer that uses gravity flow of the liquid. Our TK FloodJet tip could also be used with one of our trigger type of handguns.

There are several sectors of agriculture that can use a broadcast method of weed control. We could expect ground equipment to use the BoomJet, FloodJet, or FieldJet nozzle for these purposes along power lines, for brush control, in pasturelands, roadsides, drainage ditches, streams, ponds and other waterways to clear out choking vegetation such as water hyacinths. The process is also used to break up oil spills in Sweden and in the Gulf of Mexico.

Another use to to combine herbicides and/or insecticides with fertilizer in solution or suspension, and to broadcast apply it on fields. However, there is a problem here, a plant root will travel to a food source, whereas a given amount of herbicide must be deposited upon a plant to kill it. Therefore, one must not expect complete weed control from broadcast applications since the drops will vary in size and distribution due to pressure variations, viscosity of the liquid, speed across the field, height and attitude of nozzle in relation to the ground surface, plus any of many variables that always seem to arise at unexpected moments.

Lastly, there is the possibility of using Ultra Low Volume sprays to directly apply technical grade herbicides. The U.S.D.A. defines them as:

1. Ultra-Ultra Low Volume .....to 8 oz. per acre.
2. Ultra Low Volume ....8 oz. through 64 oz. per acre.
3. Low Volume ....65 oz. per acre to complete coverage.
4. Conventional .....to run off.

It had been proposed in 1967 that conventional be considered as all applications above 4 gallons per acre, and that low volume be from 65 oz. per acre to 4 gallons per acre.

All of you are aware of the 5 gallons per acre, and larger capacity, nozzles for weed control. We have also produced orifices that can apply less than 1 gallon per acre, but run into a series of conditions of which you might be unaware. First of all, your equipment must be scrupulously clean to continue to operate; second, pressures will have to be increased for the very small capacities in order to form the spray, and that means greater speed of the spray rig to hold down tne gallonage per acre; and last, you cannot **see** whether the nozzle is operating or not, and this is the most critical of all tne points. That which is left is a mist-type of unit using a large fan to shear and distribute the chemical over the crop area, and the obvious problems that entails when using herbicides, or the helicopter/airplane for aerial application, and this is where the spraying of technical grade chemicals originated on a large scale. Lastly, there is a method of using compressed air to atomize, impact and project technical grade chemicals onto a crop at a rate as low as 4 oz. per acre. However, 16 oz. to 32 oz. appears to be a more parctical rate to use. Fluid rates can vary with the pressure applied, degree of atomization will vary with air pressure from 7 psi to 15 psi. Experience has shown 7 - 9 psi of air is sufficient.

ADVANTAGES

1. Elimination of water hauling.
2. No mixing required—chemical is sprayed as supplied by the manufacturer.
3. More effective use of the chemical—tests indicate that ULV insecticide applications can be made on an extended spray schedule.
4. Reliable equipment is available in some areas.
5. More acreage can be covered per day.
6. More latitude is available to the chemical formulator.

DISADVANTAGES

1. Air assisted atomization creates such fine particles that wind drift will be a definite hazard.
2. Conventional equipment cannot be used. New, and more expensive controls, instruments, air compressors, pumps, etc. and other parts must be obtained to supply the accuracy needed.
3. Operators must be trained.
4. Because it is an herbicide that we are considering, absolute precission is necessary throughout the equipment and application procedures.
5. Internal cleanliness of equipment is a must.
6. If used for herbicides, the equipment cannot be used to apply insecticides or fungicides to herbicide susceptible crops. This is quite an expense to stand idle.

We are now engaged in a study of particle sizes produced by various orifices under varying conditions. So far none of this information has been published, and it may never be for its use is highly specialized. We will listen to the needs of scientists, and can often give them the information desired in short order. However, we cannot do research work for firms if it has no bearing on our needs.

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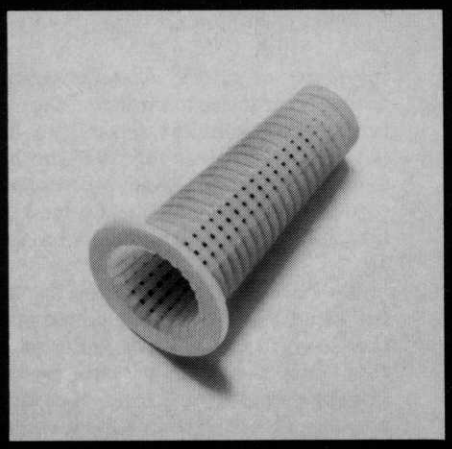

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Effects of Weed Control on the Environment

By W. A. HARVEY
Extension Environmentalist
University of California, Davis

THE only reason for any weed control practice is to change the environment:

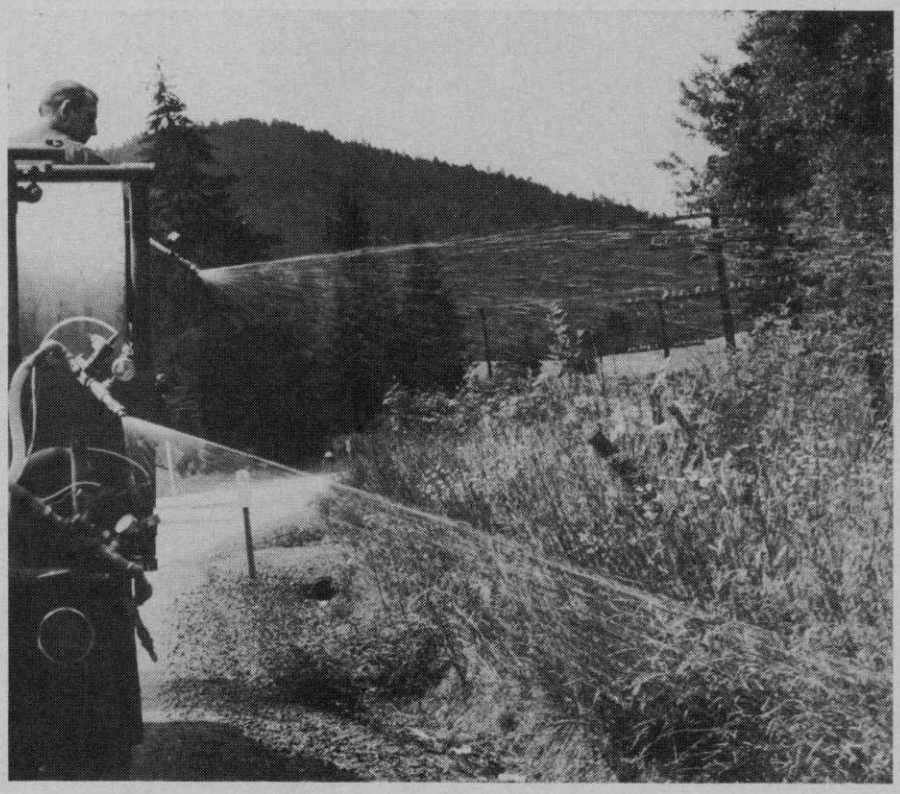
— to permit the production of food and fiber in quantities sufficient to feed and clothe our growing population.

— to provide beauty and recreation —attractive lawns, gardens, landscapes, camping sites, fishing, swimming and other outdoor sports.

— to insure safety from fire, from effects of traffic obstructions and from allergy sources — poison oak, ragweed, etc.

Control of vegetation is essential to our health, well being and enjoyment of life. And vegetation control practices change the botanical environment around us. This is true regardless of the methods used for control—hand pulling, hoeing, plowing, cultivating, burning, etc.

We know, then, that any successful weed control practice must affect the environment. We should expect this. Our concern is with possible effects outside the target area or on non-target organisms. Our principal concern is with herbicides, although we can get side effects with other control methods—soil erosion, soil compaction, air contamination with dust or smoke, etc.



We know that certain chlorinated hydrocarbon insecticides have come under heavy criticism. Organic herbicides have had relatively little criticism because most of them are low in mammalian toxicity and have short persistence in the environment under most conditions. The major challenge has been the 2,4,5-T uproar.

Let's review, briefly, what we know about environmental contamination by herbicides under four headings: entry, persistence, residues, effects on organisms.

ENTRY: Herbicides, to be effective, must become an intimate part of the environment of the target plants. It is only when they move away from the target site or persist sufficiently to affect later plantings that they become a problem. Herbicides can move by drift of particles at and soon after the time of application, by volatility from a treated area, by leaching, and by surface movement through wind or water erosion.

Drift. Small particles produced as the spray solution leaves the nozzle may remain suspended in the air for varying periods of time depending primarily on droplet size. The distance these particles will travel depends primarily on wind velocity. In any spray operation a certain fraction of the liquid will be in small particles or droplets and some drift is inevitable. The effect of this drift depends on the herbicide involved and the proximity of sensitive plants.

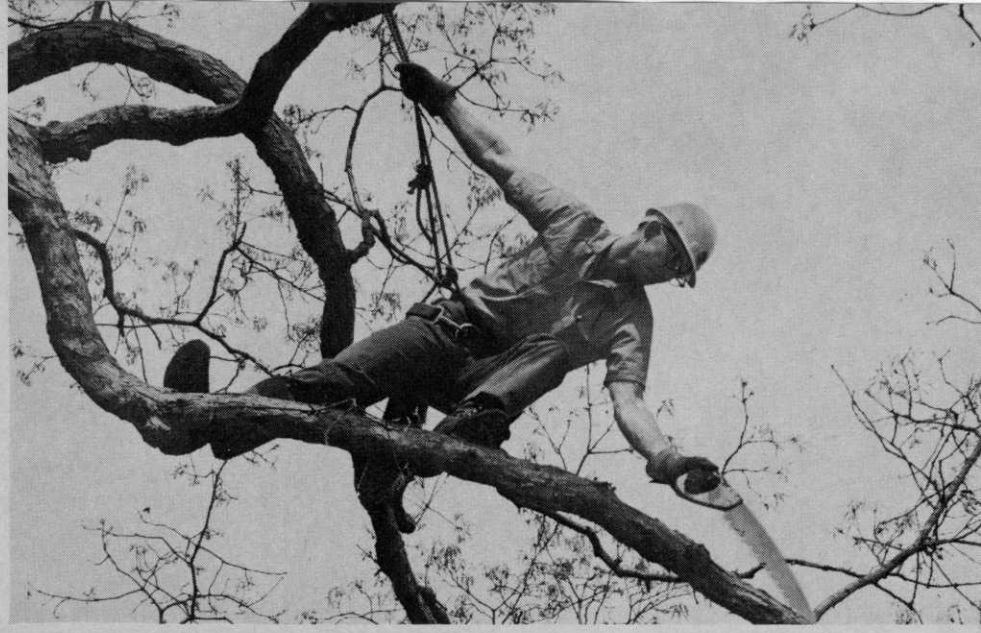
Volatility. Volatility results from movement of materials in a vapor phase from the treated area to other areas by wind or air mass movement.

Leaching. Leaching is movement of a chemical down into the soil profile with water movement. Our concern in terms of environmental contamination is not with movement in the soil itself but with vertical movement as a potential source of contamination of ground water supplies.

The amount of herbicide at different levels in the soil depends upon several factors. The soil type—sand, silt, clay, muck, etc. determines the depth of water movement in soil and consequently the depth to which any given herbicide will move. In addition the soil type has an effect through its properties for adsorption and holding molecules of the herbicide against leaching forces.

(Continued on page 16)

For More Details on the Preceding Page Circle (116) on Reply Card



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WEED CONTROL *(from page 14)*

The amount of water entering the soil either from rainfall or irrigation and the solubility of the herbicide in water are also important factors.

The final factor that affects leaching is the degradability of the herbicide itself from either chemical reactions or biological agents. The more rapidly a herbicide is broken down, the less time there is for leaching.

Because of the number of factors limiting leaching we have so far found no evidence of ground water contamination from field use of herbicides.

Surface Movement. A final method by which herbicides might move into the environment is through surface movement by wind or water, usually with soil particles. In field experience, water has been the major element in causing such surface movement. Factors affecting such movement include: slope or steepness of the area which affects run-off, permeability of the soil, amount and intensity of the precepitation, formulation of the herbicide (principally solubility), rate of application, and vegetative cover.

PERSISTENCE: Herbicides, particularly soil-applied herbicides, must persist in the environment for a long enough time to provide some period of weed control. Here we are faced with something of a dilemma.

In crop land we would like weed control during the growing period of the crop. But once the crop is harvested we may want to plant a different crop and perhaps one that is susceptible to the herbicide used in the first crop. So we don't want to jeopardize future crops with herbicide residues and yet we would like weed control throughout the growing period of any treated crop. We often must settle for a period of weed control during the germination and early growth of a crop and depend upon crop competition, cultivation, or repeated herbicide treatments to give season-long control. On non-crop sites we usually want at least one season of weed control per treatment.

Soil persistence is usually our major concern, and it is difficult to set exact values on the length of time any herbicide will remain in the soil. We know that herbicides such as the carbamates give weed control for something like six weeks whereas some of the triazines and the substituted ureas may persist for six months or more when used at crop selective rates. Soil persistence depends on several factors: rate and formulation of herbicide, soil type, temperature, moisture, organic matter, and microbial activity.

In general, soil breakdown is most rapid in warm, moist soils with good microbial growth. With some highly water soluble herbicides, leaching below the root zone may cause a rapid loss of immediate toxicity without actual breakdown. Cold soils, dry soils and sterile soils usually inhibit breakdown and prolong persistence.

Peristence in water is of concern for those herbicides used for aquatic weed control either when applied into the water itself as for submerged aquatics or when applied for emerged or ditchbank weeds when some portion of the treatment may get into canals or ditches.

There is less information on water persistence of herbicides than on soil persistence, but the literature in this area is increasing. It appears that breakdown in water is mostly microbial with definite evidence of removal from water by precipitation and by absorption on particulate matter. There is likewise evidence of peristence in bottom mud where anaerobic conditions may reduce activity of the particular microbes responsible for decomposition.

Recent studies show only minute amounts of herbicides appearing in irrigation water from ditchbank spray operations. It would appear that careful ditchbank application of current herbicides present no appreciable hazard to downstream vegetation or crop irrigations. Treatments to the water itself have caused no reported crop loss when used as directed. Most truly aquatic herbicides do affect other aquatic organisms, however, and their use is usually confined to irrigation canals where game fish are not resident.

Persistence of herbicides in air has not been widely studied. A study in Washington State over a period of 106 days during and following the wheat spraying season revealed minute quantities of 2,4-D in 80% of the air samples. Dilution by air mass and wash out by rainfall probably account for the disappearance of the limited amount of herbicides that get into the air, although

(Continued on page 40)

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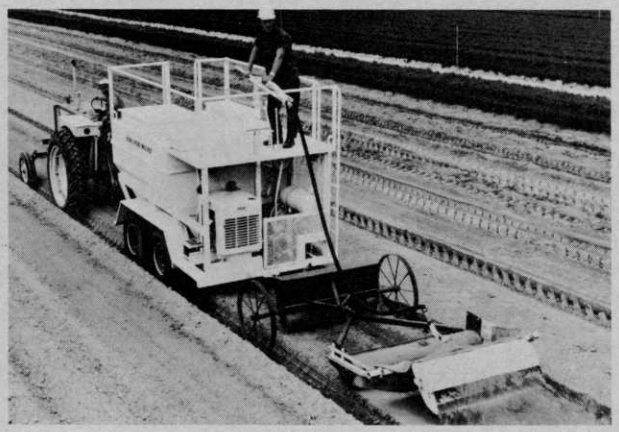

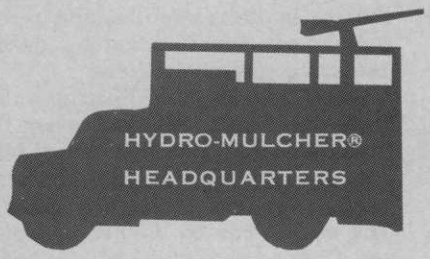

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The Hotel course is the "palm tree" course while the Boca Raton West courses are sprinkled with pines. The palms are an extra maintenance headache, and must be trimmed regularly.

Grass flies at Boca West. Year-around operation puts a strain on machines and maintenance scheduling. A partial equipment list for the four courses includes triplex greens mowers and walking greens mowers plus a complete line.

Green Industry *(from page 8)*

Arvida is a builder, a developer, and a salesman of resorts, hotels, and entire residential complexes of all kinds. It is one of Florida's largest landholders with practically all of its 34,000 acres situated in three southeastern "Gold Coast" counties. Arvida's holdings include the world-famous Boca Raton Hotel and Club, whose recorded history is more fascinating than its considerable legendary trappings.

Harry Eckhoff, facility development consultant of the National Golf Foundation, says Arvida is representative of planners and developers of modern communities who "consider golf courses one of their most effective sales weapons."

NGF records reveal, says Eckhoff, "that more than 25% of all new golf facilities opened for play in 1969 were part of golf and real estate ventures, such as high-rise apartments and condominiums, housing developments, mobile home sites and vacation or second-home projects.

Having extensive property to maintain is one thing; with golf courses included, the problem can become complicated.

Arvida has a golf course professional on its top management staff to head off maintenance problems and costs through proper development.

C. C. Shaw, who counts 40 years' experience in every aspect of golfing, knows the industry from the blueprint to the pop-up sprinkler. In essence, his job is to expertly mesh together the ideas of the architect, the requirements of a golf course, existing land available, the housing concept, and the investor's hopes for a good return on their money.

From a land developer's viewpoint, Shaw said, "a golf course is a necessary cost item." Land taken up by a golf course would return more money if it were in housing or hotel units, he explained "but people want to play golf. Some play the game from sunup to sundown. And they don't want to travel far to play, especially those who have retired."

Aside from the inclusion of golf courses in its residential and resort complexes, Arvida planners design extensive greenbelt areas.

The critical coordinating that Shaw must do doesn't end when the earthmovers take their first bite. Practically never is the blueprint totally transferable to the actual site. The project can be likened to a puzzle. Change the shape of one piece and you affect the shape of dozens

of others. Because a golf course represents a major segment of any development, any change at all will usually affect it. That's where Shaw comes in. A mistake can mean a continuing, costly maintenance problem.

A centralized maintenance system was tried, said Shaw, but it didn't work. So the system that has evolved is a landscape maintenance professional at each Arvida property. This individual works independently of his counterparts (although the superintendents of the golf courses in Boca Raton closely coordinate their activities). Maintenance budgets are a part of the respective facilities' operations.

"I'm not certain if there is such a thing as an exact budget for golf course maintenance," said Mac Parsons, superintendent of an 18-hole course and a 9-hole executive course adjacent to the Boca Raton Hotel. "We request what we think we need and usually get it. For example, we can buy sod cheaper than we can maintain it. When we go in for maintenance funds, things like this are taken into consideration."

Shaw estimated the maintenance cost for a golf course that is open year around to be "in the neighborhood of $100,000 for 18 holes."

Across town is a total community development, Boca Raton West, that will eventually encompass 1,400 acres. Plans call for four 18-hole championship courses. Two of these courses are now completed and in operation. Course superintendent is W. H. Wright.

"We try to buy all the materials we can through the University Park Nursery in Boca Raton. This is another division of Arvida," said Wright. "However, if we get a better price somewhere else, we go there."

Elevation in the Boca Raton area is about 12 feet of sand above sea level, and that means the courses experience severe leaching of fertilizers and chemicals. "We'll use five to six times the amount of organics used in the north," said Parsons.

Water supply is critical. Three deep wells at the hotel and six at Boca West are the sources. Shallow wells are contaminated with limestone and rust. Percolation and evaporation rates are high priority conditions to watch. "We may use two million gallons a day in the dry season," said Parsons.

"When the temperature reaches 80 degrees," Wright added, we can lose .3 inch of water per day."

Design of Boca West, a 1,400 acre spread of which the two operating golf courses take in 400 acres, includes numerous water holding areas. They are all connected to a pumping station located at the edge of the Hillsboro Canal, which empties into the ocean. Since too much water can be as much of a problem as too little, a large turbine pump is used to remove excess water. "We can literally reduce the water table from under the entire development," said Wright. "We have pumped 13 million gallons in a 24-hour period."

The chemical bill at Boca West runs about $15,000; the Hotel's about $7,800. About 50% goes for insecticides, 25% each for herbicides and fungicides.

Overseeding of Penncross bentgrass and Pennlawn fescue runs about $7,800 a year. The fertilizer tab is about $28,000.

Arvida Corporation, in adding new dimension to the tradition of Boca Raton, is openly sinking a fortune into the area and publicizing it lavishly. The customer has the option of enjoying the grandeur of the Hotel and Club, or purchasing a piece of the grandeur of an Arvida development and living there year around.

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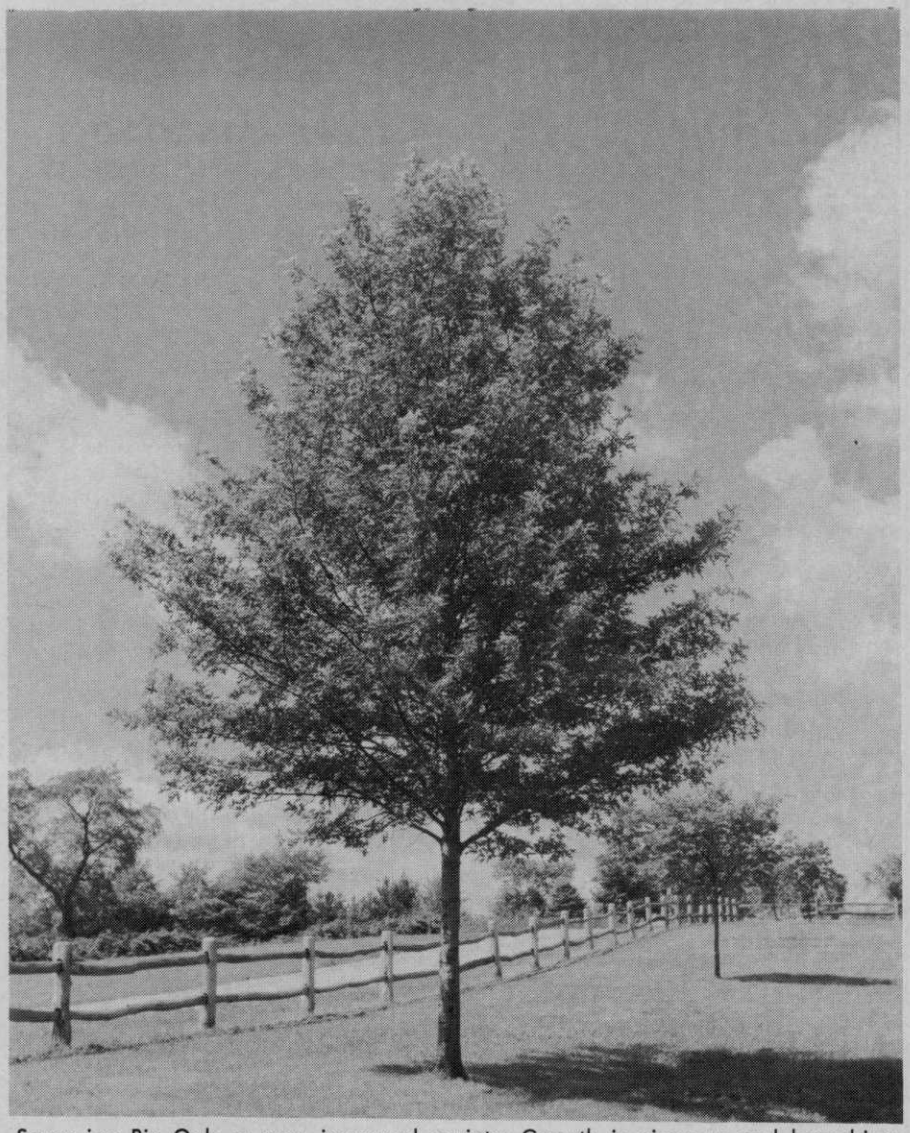
Match Tree Selection To Use Area

By WILLIAM H. COLLINS

Horticulturist
Cole Nursery Company, Inc.
Circleville, Ohio



Sovereign Pin Oak, a new, improved variety. Growth is vigorous and branching is upright and well-spaced.

THE environment around us is changing. There are changes in the soil in which we place plants—and changes in the air in which we expect them to grow.

Most kinds of plants growing in their native environment may not only be in competition with each other but also with dozens or hundreds of other kinds, each seeking to capture their share of space in the soil and in the air.

When man takes a seedling from the woods or grows one, he usually plants it in a man-altered location. Formerly such plants grew into what we call "specimen plants;" that is, naturally shaped plants, the result of little or no competition. Such plants grew more vigorously than their counterparts in a native environment. However, each year we see more clearly that the formerly favored plant is now growing in a more difficult situation than ever existed in its original native environment.

How have these changes come about?

First, we have blended, covered or removed the so-called original top soil, the result of thousands of years of preparation and a medium of relatively delicate balance. We have created either vast open space areas, or built narrow street channels between long rows of buildings where gusty winds, radiating heat and uneven rainfall patterns are not duplicated anywhere in the natural plant world.

We emit into the atmosphere quantities and kinds of gases and particles that were not formerly present. We add salts and other chemicals to roads and sidewalks, some of which may even damage foliage and trunks before they become incorporated in the soil and damage roots.

How can we find ways or plants that will grow acceptably in this environment? . . . an environment which more than ever needs growing plants!

We know we can usually provide better root growing conditions at the planting site and we can improve maintenance and care, but until we slow down or reverse pollution, one answer is to find or create more tolerant plants.

We can select and perhaps breed new trees, shrubs, evergreens and grasses that are more able to resist these man-made conditions. This means a re-evaluation, a fresh unbiased look at many woody plants that up to now may have been considered not good enough ornamentally.

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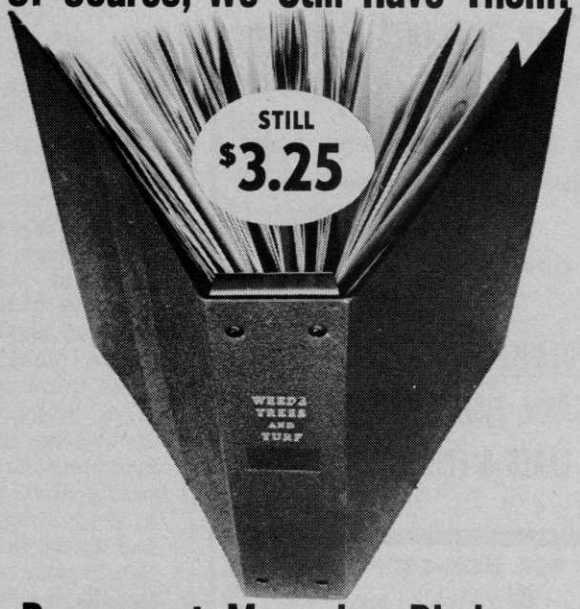

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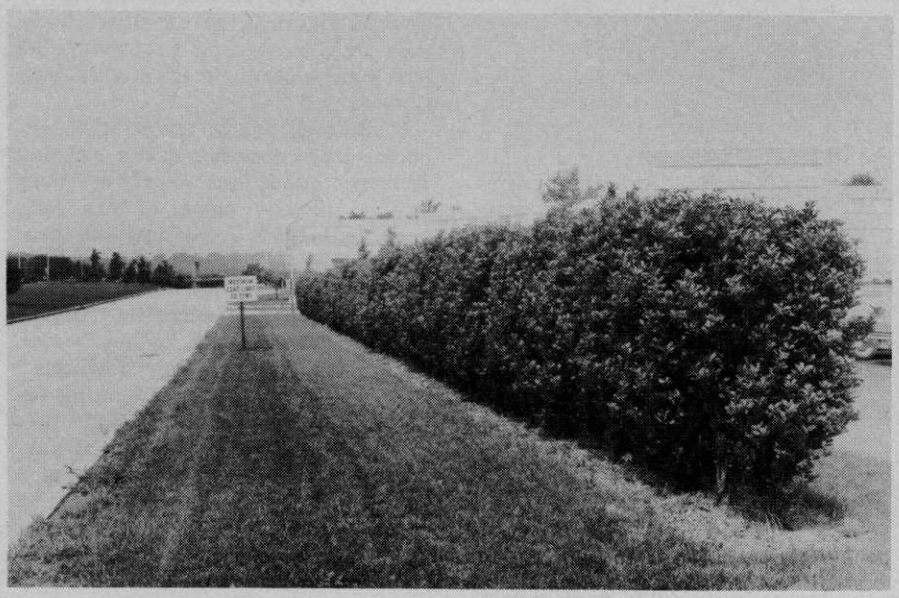
Some trees have been called "weed" trees because they have the inherent ability to self seed or to grow more easily in the same place where the specified tree struggles.

The real pressure now is to find more plants that can grow in these raw, overly exposed, overly polluted situations. Perhaps the quickest results can come from discovering or seeking out individual plants that presently are growing tolerably well in these problem areas—or at least much better than similar kinds around them. If no unanticipated problems occur during the testing and initial propagation phases for these new kinds, such trees can become available, in modest quantities, within a five- to ten-year period. It may be desirable to test plant the first propagated trees in the very areas where it is proposed they will be used.



Tallhedge is a popular hedging and screening plant. It grows tall and dense. Ideal for noise abatement plantings adjacent to highways.

In addition, professional plant explorers accompanied by plant ecologists will need to re-explore climatically similar areas of the world to find additional superior types for further evaluation and breeding.

What kinds of plants are available now that we believe give promise of growing tolerably well under our varying man-made conditions?

Many times the leads come from plants set out in ostensibly the wrong place; for example, would you expect the bald cypress, which prefers to have its roots in or near water, to do well in a high and dry situation . . . there are dozens of convincing examples to show that it does.

The honey locust is showing remarkable tolerance to normal (?) roadside salt accumulation but that

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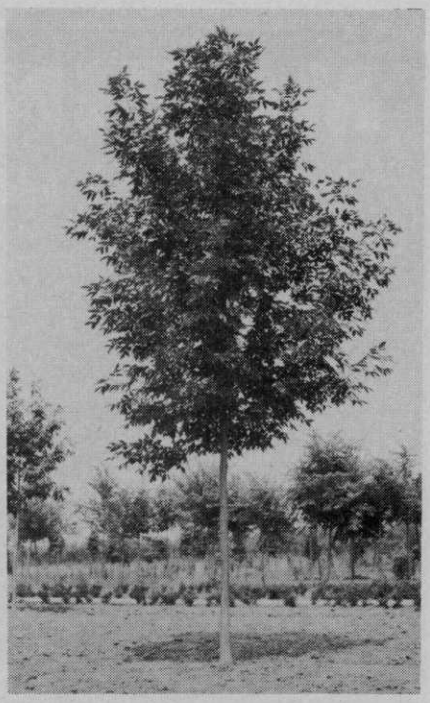
certainly does not mean if all the trees of the normally rugged Norway maple died alongside a salt-stream highway, you could replant with honey locust and have it flourish.

It is really a two-way street. While the professional plantsman strives to find more highway and urban tolerant tree varieties, let us hope that those in a position to exercise judgment in the use of aids which keep traffic moving during inclement winter weather do not wipe out such progress by increased rates of application or the use of newer, more perplexing chemicals.

We think we sense the beginning of a gradually changing attitude about trees in the environment immediately around us. People are saying that the places they want to enjoy trees are where they live and where they work. Each year the family who takes to the road to enjoy the woods, the park or the forest preserve find it necessary to travel farther and faster to get there.

A number of promising new varieties are available and indicate the progress that is being made in the selection of superior trees. Seedling trees of oak, ash, maple and other popular kinds are naturally quite variable. They have different shapes, heights, branching structure; differences in leaf size, leaf color, fall color and texture. But when an obviously superior tree is discovered,

Autumn Purple White Ash has dark green leaves that turn to deep purple or mahogany during the fall. The coloring will last from two to four weeks.



Marshall Seedless Green Ash leaves turn yellow in autumn. This tree thrives almost anywhere.

trees propagated from it are usually identical with the parent tree.

This fact is the basis for the plant patent laws and assures the users of vegetatively propagated trees that such plants will develop into similar progeny.

In the past, many variety selections were made on the basis of just one or two minor distinguishing characteristics. Modern tree selection attempts to include many of the inherent good qualities the species possesses. A tree with excellent form will be passed by if the foliage is disease susceptible or the fruit too large. New selections are nearly always vigorous, of excellent form, pest free, hardy and processing the best combination possible of foliage, flowers and fruit.

Plantsmen today try to find superior trees growing under existing adverse conditions — along busy streets, in the heart of the city, near industrial areas and the like. The parent tree may be growing in a 3 to 4 foot tree lawn and yet still be in good health when its trunk is as large as 12 to 15 inches across. Or it may be growing downwind from an industrial plant looking remarkably good in spite of air pollution and the deposit of dust particles on its leaves for months at a time. In sites like these, the budded trees grow better than the naturally occurring mixture of seed trees. We recognize that not all situations would call for the budded or grafted tree.

For More Details Circle (114) on Reply Card

meeting dates

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Indiana Annual Winter Conference, Indiana Association of Nurserymen and Indiana Arborists Assn., Stouffer's Inn, Indianapolis, Ind., Jan. 4-6.

Northeastern Weed Science Society, 1972 Convention, Hotel Commodore, New York, N. Y. Jan. 5-7.

Connecticut Tree Protective Association, Hotel Senesta, Hartford, Conn., Jan. 6-7.

Georgia Golf Course Superintendents Association, Annual Meeting, Augusta Golf Clubs and Holiday Inn, Augusta, Ga., Jan. 9-11.

Western Association of Nurserymen, 82nd Annual Meeting, Plaza Inn, Kansas City, Mo., Jan. 9-11.

Helicopter Association of America, 24th Annual Meeting, Stardust Hotel, Las Vegas, Nev., Jan. 9-12.

Mid-Atlantic Golf Course Superintendents, Annual Conference, Holiday Inn Downtown, Baltimore, Md., Jan. 10-11.

Tennessee Turfgrass Association, Annual Conference, King of the Road Inn, Nashville, Tenn., Jan. 10-11.

Nebraska Turfgrass Conference, Tenth Annual, Kellogg Center, Univ. of Neb., Lincoln, Neb., Jan. 12-14.

New Hampshire Turf Seminar, University of New Hampshire, Durham, Jan. 13-14.

Georgia Nurserymen Short Course, Annual, University of Georgia Center for Continuing Education, Athens, Ga., Jan. 13-14.

California Weed Conference, 24th, Del Webb Towne House, Fresno, Calif., Jan. 17-19.

Southern Weed Science Society, Annual Meeting, Statler Hilton Hotel, Dallas, Tex., Jan. 18-20.

Winter Turf Course, Rutgers University, New Jersey. Three-day course in lawn and utility turf, Jan. 17-19. Three-day course in golf and fine turf, Jan. 19-21.

Michigan Turfgrass Conference, Michigan State University, Kellogg Center, East Lansing, Mich., Jan. 19-20.

Ohio Chapter of the International Shade Tree Conference and the Ohio State University short course for arborists, turf managers, landscape contractors, garden center operators, nursery men, and others, at the Sheraton-Columbus Hotel, Columbus, Ohio. Jan. 23-27.

Allied Horticultural Trades Congress, Special Sod Grower Session and Luncheon, Skyline Hotel, Toronto, Ontario, Canada. Jan. 24-26.

Virginia Turfgrass Conference, Sheraton Motor Lodge, Fredericksburg, Va., Jan. 25-26.

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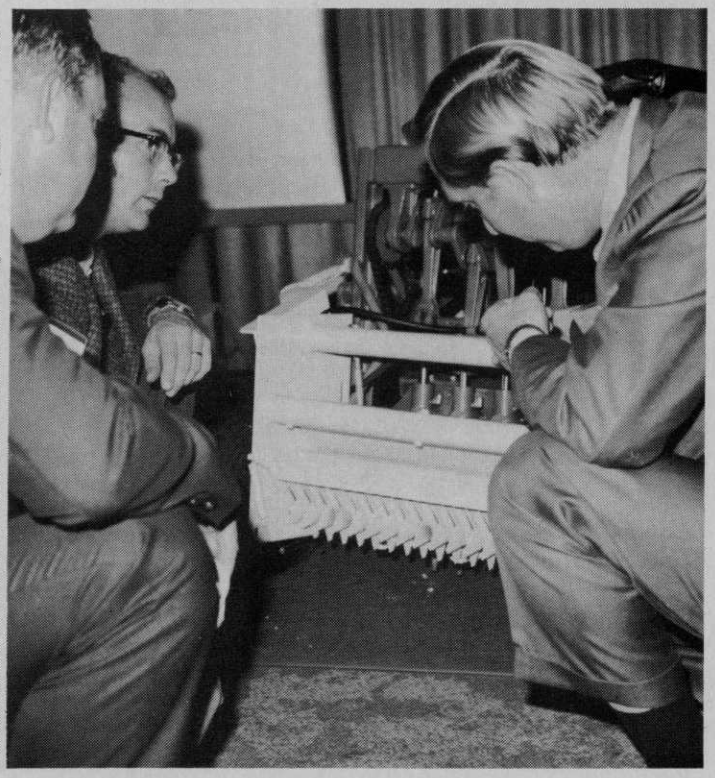

Two interested customers take a closer look at this core shredder attachment. Here, Harold Skaggs shows how cores are shredded as a golf green is aerated. Opposite, Letherman's, Inc., was typical of trade show exhibits. More than 1,000 people attended the trade show and conference.

Ohio Turfgrass Conference

Fifth Annual Show and Tell

TWENTY-THREE speakers discussed 25 subjects of interest with over 1000 golf course superintendents, sod growers and industry men at the 5th annual Ohio Turfgrass Conference and show in Cleveland in early December.

In what might be described as a technical short course and trade show, guest speakers detailed useful information on nearly every phase of turf nutrition, maintenance and turf protection. The conference brought together specialists from seven eastern and midwestern states.

While most topics presented dealt with practical management techniques or reported on research projects, Ohio State University dean of agriculture, Roy M. Rottman, presented a timely speech on "Rhetoric vs Reality."

Time for a business chat or a hard sell approach. Seed, equipment, and other turf maintenance items were displayed in 124 exhibits.

Speaking about ecology, pollution and quality of the environment, he said "it is regrettable that so many individuals who fancy themselves as environmentalists have just not had sufficient scientific training to know whereof they speak . . . Those of us with educational background in the sciences have an obligation and a responsibility to expose the rhetoric of 'environmental gloom and doom' for what it really is and at the same time present as clearly and as forcefully as we possibly can such scientifically sound information as is available."

On public concern about pesticides, he said the scientific community has done a good job of advising the public about the direct hazards of pesticides to humans, wildlife and animals. He also praised the research accomplished and the regulations enacted that prevent toxic residues in our food.

"The current controversy centers on the public concern of the possibility of environmental pollution of pesticides in the ecosystem." he said.

The university dean told conferees about a new Laboratory for Environmental Quality on the campus of the Ohio Agricultural Research and Development Center. He said

If you need golf course equipment we have the machines, says this Toro representative. Their large exhibit area displayed the latest in turf mowers.

Scholarship winners were announced at the annual turfgrass banquet. Paul Morgan, Browns Run Country Club, Middletown, presents the Clark County Technical Institute scholarship to Tom Aldrich, middle, and Barry Muskus. Not pictured but winner of the Ohio State University scholarship were John Miller and Alan Gibson.

Soluble forms of nitrogen was also a topic. Nitrogen plays a key role in feeders of nitrogen; hence, on an annual basis more of this element must be supplied as fertilizer than phosphoric acid and potash."

He listed ammonium sulfate, ammonium nitrate, nitrate of soda and urea as the more commonly used inorganic or soluble forms of nitrogen. Ureaform, a combination of urea and formaldehyde contains both soluable and insoluable fractions.

"The total nitrogen requirement for the growing season must be balanced with the phosphorus and potash levels and, these in turn, balanced against the natural plant food supplies in the soil. The use of nitrogen, especially soluble forms, must be keyed to the prevailing climatic conditions and adjusted to conform to the growth rate of the turfgrass," he concluded.

The Golf Course Superintendents Association of America awarded scholarships to four Ohio State University students. Here an official presents the award to: (l-r) Edward Randall Huff, Ted Lee Mochel, Robert Carl Robinson, and Stephen Otto Kilmer.

Tree Removal Stirs Ire of Miami Citizen

The City of Miami set a precedent for South Florida when it recently passed an ordinance preventing cutting of trees without a permit. And, backing up the new law with a Tree Bank is a group of conservation minded men lead by Jonathan Seymour, a Miami landscape architect.

What triggered the long considered ordinance was an ambitious realtor's stripping all growth from a wooded "hammock" area along Biscayne Bay. The large acreage is located along a mile of early-year mansions, with the growth too heavy to even glimpse the houses. Hundreds of virgin trees, including aged live oaks, Geiger trees, and a wealth of other rare tropical growth.

The bulldozed property, which extends from Brickell Avenue to Biscayne Bay is considered less attractive today because of its neighboring contrast. Explanation of the developer, who "had no idea" what the land would eventually be used for, was "the better to sell it."

This instance climaxed years of protest against builders stripping every tree and twig from property when new homes and complexes were being built. However, this was softened some when the Metropolitan Government of Dade County passed an ordinance requiring X number of plantings for every foot of new building per property.

The Miami ordinance stipulates "woody perennial plants" with trunk diameters of three inches, three feet "above grade," and a minimum of 15 feet, to come under the new law's protection.

Also, the ordinance applies to all vacant and underdeveloped property; in all zoning classifications intended to be redeveloped and yard area of all developed property.

It declares that "no person, organization or corporation, or any representative thereof, shall cut down, destroy, remove or effectively destroy through damaging any trees situated on described property with-

out first obtaining a permit for removal. . . ."

Furthermore, a permit "shall not" be issued for tree removal unless, (1) the tree is located in the building area or a yard area where a structure or improveemnts may be placed and "unreasonably" restricts the permitted use of the property. (2) The tree is diseased; injured, in danger of falling, too close to existing or proposed structures, interferes with utility service, creates unsafe vision clearance, or conflicts with other ordinances or regulations.

Permits are to be reviewed by the Miami Building Dept., including field checks and referrals of applications to other departments or agencies as necessary to determine any adverse affect upon the general public welfare, adjacent properties or city services or facilities.

Mr. Seymour said that so far, the "Tree Bank" includes arrangements with the County and the various Municipalities to first, use the trees, or heel them in until they can be permanently planted.

The Bank is interested in all movable trees, but especially the live oaks which abound in the city. He said too, that the State Department of Transportation has expressed interest in using untold numbers of displaced trees in highway plantings.

Wood Bark Industry Now Organized

Use of wood bark as a natural mulch and soil conditioner to benefit the environment is the aim of a new national organization.

Named the National Bark Producers Association (NBPA), this group will represent the bark processors and marketers of the nation. It's principal objectives will be to increase the use of bark products, establish and maintain high industry standards, provide new research programs, and speak for the industry as a whole on important national issues.

According to recent soil and erosion experiments conducted by the State of Florida, wood bark is the most effective natural mulch and soil conditioner available. The Florida tests showed that pine bark mulch reduced plant shock during rapid temperature changes and was the only natural mulch tested that did not crust and harden. Pine bark retains more than two and a half times its weight in moisture and is virtually disease and weed free.

National Bark Producers Association represents 20 member companies, whose sales amount to several hundred million dollars. In 1971, about 15 million tons of wood bark was generated by the wood and paper industries.

Transvaal Buys Herbicide Plant

Transvaal, Inc., an Arkansas based firm, has announced plans to produce phenoxy herbicides for commercial weed and brush control.

Production facilities for the new firm were previously owned by the Hercules Company, Inc. Transvaal has purchased the plant, the production techniques and the use of the trademarks Brush-Rhap, Weed-Rhap, Propi-Rhap and Silvi-Rhap.

M. L. Wilkerson, Transvaal president said. "We plan to take basic chemicals and produce 2,4-D and 2,4,5-T. Our plant is capable of producing 8 million pounds annually. Once production begins, we plan to carry a work force of up to 60 personnel."

He pointed out that his firm is one of three producing phenoxy herbicides in the U.S. today.

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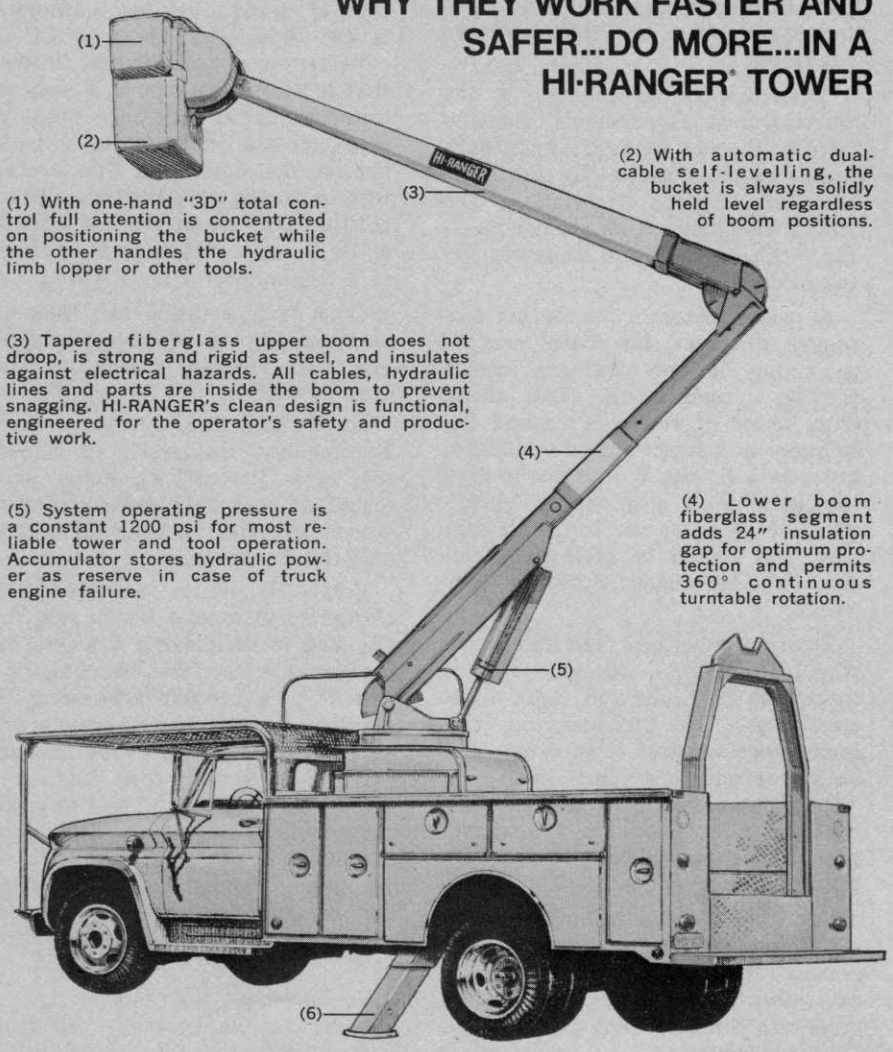

(1) With one-hand "3D" total control full attention is concentrated on positioning the bucket while the other handles the hydraulic limb lopper or other tools.

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CONTINUOUS TRAINING

Technique For Holding Employees

Diked out in Cardinal plumage, Fred Diehl, Bruce-Terminix of Broward, Inc., Fort Lauderdale, gave his audience advice on how to prevent expensive turnover in employees, or, how it is in the ornamental horticultural spray business. He, and his teammate, Douglas Palmer, Broward Community College, shared an important niche in a recent short course program; Doug speaking on the mechanical requirements for spraymen, and Fred turning the barb in the field of labor relations.

The short course was held by the Horticultural Spraymen's Association of Florida in Fort Lauderdale, and was co-sponsored by the Florida Pest Control Association. The HSAF also marked its annual meeting, with officers and directors being elected.

A prime factor in preventing employee turnover, Mr. Diehl said, is to supply proper training before putting a man in the field alone. But, "some of you won't spend ten minutes to instruct a new employee, but you will take 30 minutes to give him hell." And, stop saying "sprayman." It is a service job with dignity, and should be referred to accordingly. He suggested "spray technician."

Take an untrained man and never stop training him. Don't be biased; forget the long hair and, don't draw conclusions. He stressed too, the importance of first impressions for both management and applicant. "Your attitude as an employer must indicate enthusiasm for your company and the position you are filling; show some spirit."

Don't do all the talking; this is a time to listen, to evaluate the applicant. Also, don't be hepped on education; some men without degrees can come up with better ideas than the "educated."

Employee turnover is not due to size of the pay check or the benefits, but from lack of basic training when a new man reports for work. Mr. Diehl suggested first, sending him on the job with one of your "old timers," but one who can communicate. This doesn't necessarily mean your "best" man, either, but one who can teach. Some know the business backward and forward, but are unable to pass that knowledge on to others.

Training, Mr. Diehl stressed, takes time and patience; don't let a new man's interest wane . . . ask him leading questions right along; give him bulletins and magazines about the industry to read; make him feel a part of the team . . . make him understand that you are concerned about his progress.

By all means, explain about the cost of doing business; equipment, labor, time, etc. Show what was collected on the job he just finished; that it isn't all gravy. It is easy and understandable how an employee may get the idea while sweating behind the hose, that you are sitting in an air conditioned office . . . getting rich! When you send him on a job he must realize he is in charge of a large piece of your wallet.

Only your attitude can make an employee proud to be working for you, and forestall expensive turnover in men.

Dr. Donald Short, Department of Entomology, University of Florida, told of a "juvenile hormone" being tested on sod webworms and army worms, designed to keep them small and non-productive.

Ralph W. White, Southern Turf Nurseries, Pompano Beach said that the key to diagnosing diseases and pest trouble in turf is "working education" . . . keeping abreast of the plentiful technical information available, attending short courses and being active in "your industry's trade association." The practical comes with observation, experience, etc.; this is not a science, but an art. Also, "education is no substitute for flat feet. You can be over educated without the practical know how."

He stressed the importance of keeping legible records; you can't keep everything in your head. Study the seasonal peculiarities of pests, and the "patterns" of grass. Be a careful observer; anticipate results of drought, too much water. . . . With time they will form a pattern . . . but remember . . . symptoms do not necessarily indicate the cause.

President Joseph C. Shaw, Shaw Nursery and Landscape Co., South Miami, relinquished the gavel to Craig Anderson, The Professional Sprayers, Inc., of Fort Lauderdale. Other officers include Charlie P. Johnson, Charlie P. Johnson Spray Co., Miami, executive vice president, and three regional vice presidents: Larry Hatcher, Plant Industry, Inc., Lantana; Roger Harris, Roger's Landscape Service, Pompano Beach and Patricia Bay; Pat's Spray Service, Winter Haven.

Illinois To Hold Pesticide Clinics

A series of one-day clinics to acquaint Illinois pesticide dealers and applicators with new provisions in the Custom Application of Pesticides Act are scheduled during March.

Ten clinics across the state will review important revisions in the licensing of dealers and applicators. The University of Illinois Cooperative Extension Service and the Illinois Department of Agriculture, Division of Plant Industry will jointly sponsor the clinics.

Specialists from the university will provide up-to-date pest control recommendations for small package dealers. This year the information will also be included for applicators and operators who control tree, shrub and turf pests.

According to the act, pesticide applicators and operators must now be licensed, says Roscoe Randall, University of Illinois extension entomologist.

Two types of licenses will be issued. One will be the pesticide applicator's license issued to persons who own or operate custom application businesses. The other, the pesticide operator's license, will be issued persons employed or directly supervised by pesticide applicators. This includes supervisors and operators of application equipment, persons handling, mixing, applying pesticides outside a structure, and disposing of excess materials and containers.

The revised law also includes people who apply landscape and turf pesticides commercially.

Representatives from the Department of Agriculture, Division of Plant Industry, will administer the examinations for both licenses at the end of each clinic.

Dealers and applicators can also contact their county extension office to make reservations for the clinics they plan to attend.

Grounds Maintenance Conference Scheduled

A Grounds Maintenance Conference sponsored by the University of Connecticut Cooperative Extension Service and the Southern Connecticut Grounds Keepers Association will be held Wednesday, February 23, in Cheshire, Conn. The conference will present new ideas, recent discoveries in research and practical recommendations as they apply to trees, shrubs and turf.

This program has been arranged to meet the needs of commercial or professional grounds maintenance personnel of parks, golf courses, industrial buildings, cemeteries, residential and recreational areas, as well as those involved in the wholesaling and retailing of garden products.

Safety Act Booklet Available

Widespread concern on the part of members of the nursery industry over regulations and penalties covered by the new Federal Occupational Safety and health Law has prompted the distribution of a special booklet prepared by the American Association of Nurseymen.

Called "Occupational Safety and Health Act — And You," the booklet is being distributed to AAN members.

Standards covered in the new law apply to everyone who is not strictly agricultural, according to AAN Adminstrator Richard F. Turney. "This means retail garden centers, landscape operations, etc., are covered by the general standards," Turney says.

The Occupational Safety and Health Act covers virtually all employers engaged in commerce, the AAN booklet points out. Enforcement of the act is through a series of inspections, administrative hearings and appeals, all governed by an Occupational Safety and Health Review Commission.

Willful repeated violations by an employer may subject him to fines up to $10,000 for each violation. First violation citations and less serious violations may incur fines up to $1,000 for each. Any employer who fails to correct a violation within the time period permitted may be penalized up to $1,000 for each day the violation continues.

These are some of the general standards explained in the AAN booklet:

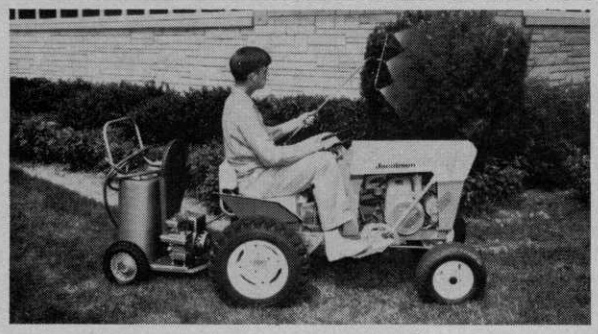
"All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition. The floors of work areas shall be dry; when wet processes are used, drainage shall be maintained and platforms, mats or other dry standing places shall be provided where practical."

"Every wall opening from which there is a drop of more than 4 feet shall be guarded by rail, roller, picket fence, half-door, or equivalent barrier."

"Portable wood ladders and fixed ladders are the subject of detailed standards with respect to type of wood used, joints, dimensions, thickness of handrails, rungs, etc."

"No lock or fastening to prevent free escape from the inside of any building shall be installed."

"Fire extinguishers shall be conspicuously located where they will be readily accessable along normal paths of travel and immediately available in the event of a fire."



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SOD INDUSTRY SECTION

ASPA — California or Bust

The greatest sod producer activity ever conducted is what the American Sod Producers Association boasts about their Educational Conference and Field Day, at the Disneyland Hotel, Los Angeles, Calif., Feb. 22-24.

ASPA officials say this year's program will encompass more topics and speakers than ever before. Prominent turf authorities, nationally and internationally known for their contributions to the turfgrass industry, have been invited to participate.

Speaking on the topic, "Technology of Sod Harvesting, Shipment and Transplanting," will be Dr. James Beard of Michigan State University. Dr. Glenn Burton, Agriculture Research Service, USDA, a turfgrass breeder and developer of the Tif-varieties of hybrid Bermudagrasses will speak on, "Development —Past and Future of Improved Warm Season Turfgrasses."

Toby Grether of Cal-Turf, Inc., will talk on "Sod Production in California." Other speakers on the program include Channing Jones, Ortho Garden and Home Marketing, Donald Juchartz, Director of Wayne County, Michigan, Cooperative Extension Service, and Dr. Victor Youngner, University of California.

The afternoon session of each day will be devoted to field tours of research plots and demonstrations. Visitors will tour the Cal-Turf Sod production facilities, the Cal-Hy production facilities and view demonstrational plots of chemical performance.

A highlight of the conference will be the equipment field day. Many types of products and machinery for sod production will be discussed and demonstrated. Many are new to the industry and offer more efficient and economical techniques in doing the job.

In addition, a special tour of Disneyland for sod producers has been organized. Others may tour agricultural areas of southern California.

Consumer Protection Highlights Sod Growers Meeting

Consumer protection in the sod industry was the major topic at the annual meeting of the Maryland Turfgrass Association, Inc., in December.

Discussion was triggered by an explanation of proposed amendments to the Virginia sod law by Dennis E. Brown, a representative of the turf and seed regulatory section in the Old Dominion's state department of agriculture.

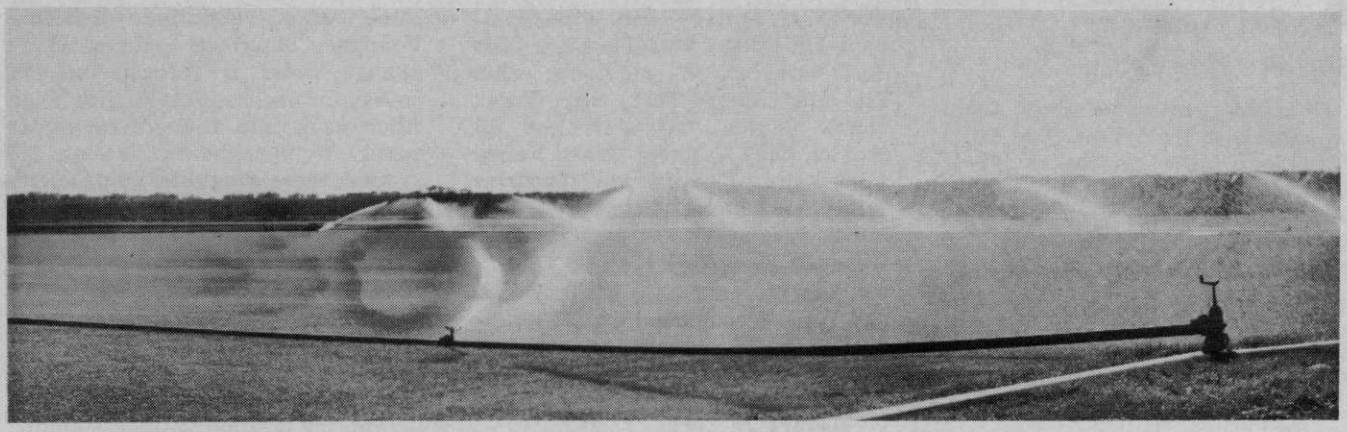
One of the proposed amendments to the Virginia law would require that sod installers be licensed by the state in the interest of consumers. Maryland sod law already operates in the interest of consumers without a dealer licensing requirement.

Besides Maryland and Virginia, only two other states — Michigan and Kentucky — are known to have a law pertaining exclusively to sod.

New officers of the Maryland association were also elected at the meeting. They are: Emery R. Patton of Silver Spring, president; James Maxwell of Rising Sun, vice-president; Eugene Roberts of Glenn Dale, treasurer, and Dr. John R. Hall III of Silver Spring, secretary. Dr. Hall is Extension turfgrass management specialist at the University of Maryland in College Park.

New directors of the statewide turfgrass trade group are David Hamilton of Waldorf, Larry Moore of Daisy and Gordon C. Keys of Olney.

Gabriel Eros, left, president of Ontario Seed Cleaners & Dealers Limited, Brampton, Ontario, shows grass seed samples to Yasuharu Ikegami, a representative of the forage seed mission from Japan visiting Canada. Right is Ontario Seed's plant superintendent, Sam Vesely. Mr. Ikegami is chief of export in the domestic section, Nagoya Plant Protection Station, of Japan's Ministry of Agriculture and Forestry. The purpose of the mission was to familiarize Japanese authorities with forage seed production and contract growing opportunities in Canada as well as to discuss regulations governing seed exports to Japan.



Costs of irrigation, pumps and associated pumping equipment must also be calculated into the overall production expenses.

A Sod Producer's Two Goals

By RICHARD E. SCHMIDT

Associate Professor of Agronomy
Virginia Polytechnic Institute
Blacksburg, Va.

A SOD producer has two major objectives. The first is providing a quality sod and the second is to produce the sod efficiently, which means as rapidly as possible.

In meeting the first objective the sod producer is handicapped to a large extent. Information on adaptability is lacking on the many varieties and strains he may choose to grow. Many strains and selections are released without knowledge of particular environmental adaptability.

Many times a grass may be well adapted to the conditions existing at the sod farm, but will not tolerate the usage, management or environment of the area on which it is eventually installed. Information concerning the response of specific varieties to specific ecological conditions would be desirable and most helpful in selecting strains and formulating mixture and blends in order to produce a quality sod.

Attempts are being made in the northeast to obtain this type of information on the various Ky bluegrass cultivars. Experiment stations from Vermont to Virginia are cooperating in evaluating the commercially available as well as many of the promising experimental varieties and strains.

Efficiency of production involves the interrelationships of the turfgrass physiology, morphology and environmental conditions.

Sod strength or rolling ability indicates when a sod is ready for harvest. In essence this is directly related to the development of roots and rhizomes.

The roots of cool season grasses generally renew themselves from November to April, with the most rapid root development occuring in April. Little root growth can be expected during the summer months.

Cool season grass rhizome initiation is not dependent upon cold weather as often is thought since most rhizome formation occurs in the spring.

Rhizome development is associated with the long day and short phenomenon of spring, independent of exposure to low temperatures. The production or roots and rhizomes in the spring is the main reason sod is not considered harvestable until the grass overwinters regardless of season established.

In some areas, similar to those found in Michigan, sod can be produced more rapidly than in other areas, such as here in the mid-Atlantic area.

This is often puzzling because here we have longer growing weather in the fall and early springs than are experienced in Michigan. Their advantages are associated with the organic soils on which they grow sods.

These muck soils have a high water holding capacity, and a tremendous nutrient holding capacity. Seldom are these soils lacking in moisture and often are saturated for long periods of time. This forces mass root development near the soil surface.

Now, it's not advocated that soils be continuously saturated to develop large quantities of roots near the surface, but my observation is that most sod fields in the east are under irrigation.

Information is needed on when and how to irrigate mineral soils to best produce root development for sod production. It appears that excess water at the wrong time reacts like excess nitrogen at the wrong time.

Less companion grass should be incorporated in Ky bluegrass mixtures seeded in spring than in the fall.

All year old sod containing a companion grass was weaker than pure Ky bluegrass sod. The companion grasses in order of reducing sod strength were as follows: perennial ryegrass > annual ryegrass > creeping red fescue > redtop. However, the rooting ability was enhanced, to a certain extent, inversely with sod strength.

Possibly this information may be used by sod growers in formulating seeding mixtures to obtain sod strength quickly as well as providing a rapid knitting sod.

Ohio Sod Growers Organize New Group

Ohio sod growers, meeting in conjunction with the recent Ohio Turfgrass Foundation annual at Cleveland, formally organized an Ohio Sod Growers Association. Potential for the group will be more than 80 growers plus supplier membership, for which there is a category.

John R. Kramer, Kramer & Sons, Westlake, was named president by the group. Other officers are: Chester Augspurger, Cincinnati Turfgrass Nursery, Inc., vice-president; Dr. Robert W. Miller, The Ohio State University, secretary; Don Figurella, Best Turf Sod Farm, North Canton, treasurer; and directors, Cecil Collings, Green Valley Turf Farm, Youngstown, Woodrow Wilson, Eastside Nurseries, Inc., Canal Winchester, and Jack Schiller, Haywood, Inc., Oak Harbor.

Kramer reports that both Class A and Class B memberships are available at $50 per year for each. Growers are eligible for Class A, and businessmen suppliers for the Class B category.

First meeting of the Board following the organizational session is scheduled for 12:00 noon, Jan. 25, at Columbus, O. Data on this session and memberships are available from either Kramer (24617 Center Ridge, Westlake, Tel. 871-4092) or from Dr. Miller (1827 Neil Ave., Columbus, 43210).

CALLING ALL SOD GROWERS!

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Dr. Henry Indyk
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AMERICAN SOD PRODUCERS ASSOCIATION
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Tel. (201) 247-1766
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Plants Vital; But Can't Solve Pollution

Green plants such as ornamentals and turfgrass can be valuable in improving environmental conditions, but the plants should not be considered as a cure-all remedy.

Dr. V. B. Youngner, head of turfgrass research at the University of California, said many of today's ecologists are overestimating the effectiveness of turfgrass and ornamentals because they don't have the facts. He says that there are two major fallacies concerning green plants and pollution.

One is that plants will purify the air as it passes through them. He pointed out that some filtering does occur, but only in the gases that actually pass through the plant. As an example, Youngner said that polluted air might be several thousand feet high but wouldn't be filtered very well by a turf that might be only a couple of inches high.

Another misconception is that the production of oxygen by green plants will salvage the quality of the atmosphere.

"Certainly oxygen is given off by the plants, but there is no shortage of oxygen. The problem is one of pollutants in the atmosphere," Youngner commented.

Vegetation can play a very vital role in prevention of air pollution by dust and other particles, according to speaker Younger.

People involved in turfgrass management have better opportunities to solve water pollution problems. Youngner described systems where sewage water is sprayed on golf courses or ornamentals so that it can filter back into the ground water supply. By the time it filters into the ground, there should be no problems such as those occurring with direct dumping or run-off situations.

"People involved in the management of turfgrass and ornamentals have been environmentalists long before the word became so popular," Youngner said. "They have an important role but they must perform it from the position of understanding their actions and being careful to avoid any new contaminant problems."

In southern California, studies are underway using vegetation to establish "green belts" along mountain sides. The belts would aid in water conservation, disposal of sewage water, fire prevention or retardation, and recreation. Other research is determining the effect of different moisture levels on plants native to the region and the feasibility of establishing introduced species.

Definition of A Farmer

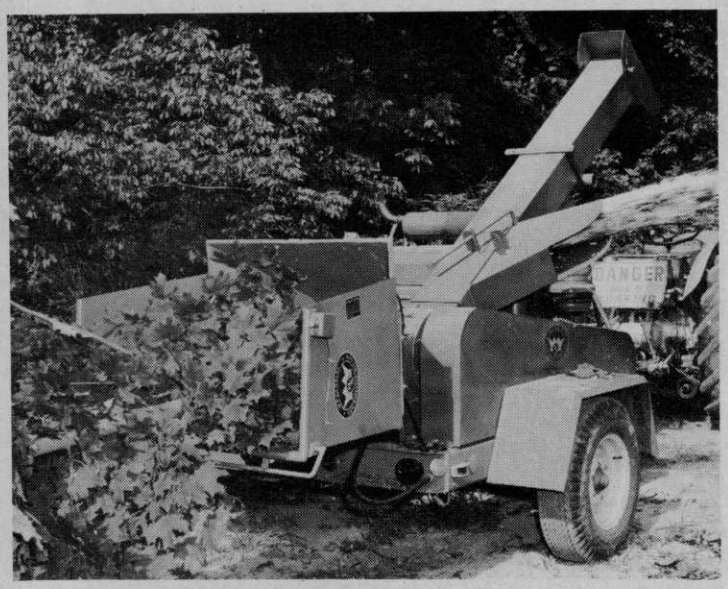
Who is a farmer? That's the question the Florida Project Agriculture Advisory Committee faced. To answer this, members of the committee, chaired by James F. Griffin, Jr. executive vice-president of the Florida Nurserymen and Growers Association Inc., took many things into consideration.

A state-wide study was made for adjusting agricultural education and training programs so that they will better meet the needs of the Florida agricultural industry.

The committee defined a farmer as a land owner, operator, renter, lessor, or sharecropper who cultivates land. He is one who on 10 acres or less realizes at least $50 per acre gross income, or on more than 10 acres returns at least a total of $270 gross income from his farming operation.

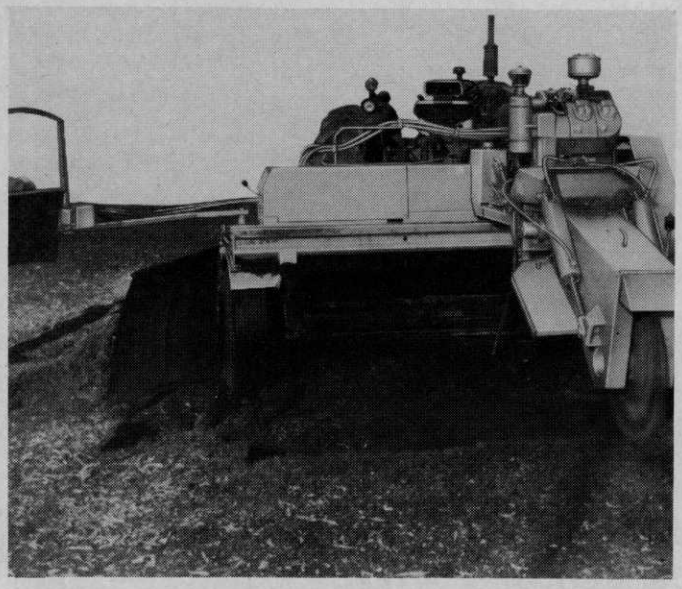
Acreage of land is not necessarily a good criterion for deciding who is a farmer, said Griffin. Total man months of labor required and total income received from farming operations in a given year are better, but not complete.

"For example what about the person who has a crop failure due to drought or pests? What about the fellow with a half acre of land who makes a good livelihood raising watercress?" Griffin said.



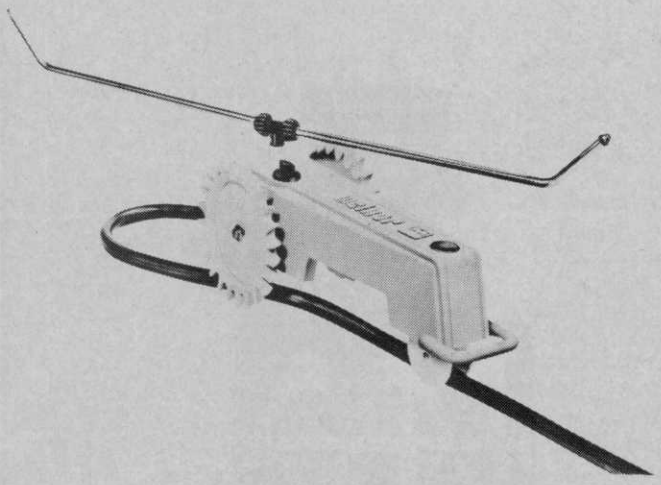
BRUSH CHIPPER: M-B Company, New Holstein, Wis.

M-B Fitchburg chippers are available in three models, handling round wood sizes up to 7" in diameter. A unique, spring-activated feed plate adjusts to various wood sizes, eliminating the need for a feed plate. Many communities are using chippers in brush and tree removal instead of burning. This reduces the hazards of air pollution and chips can be easily disposed. For more details, circle (701) on the reply card.



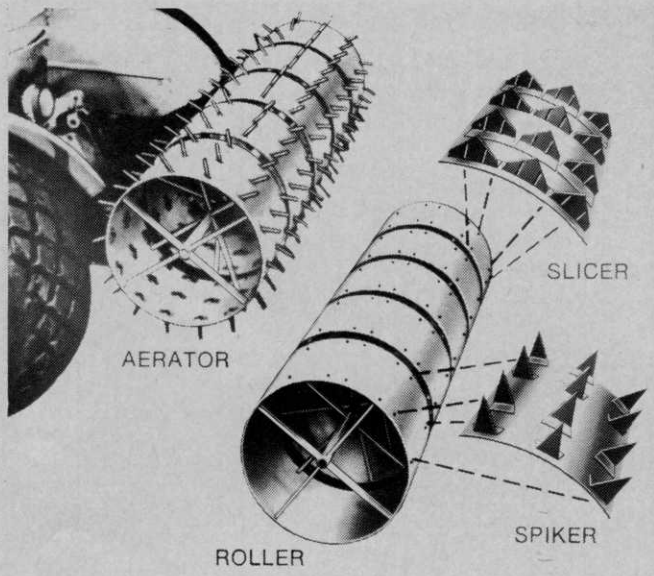
STUMP CUTTER: Vermeer Manufacturing Co., Pella, Ia.

An exclusive "reach-out" cutting wheel which hydraulically extends into tight spots (next to walls, buildings, trees, etc.) is a feature of Vermeer Model 2460A, a 65 hp stump remover. Its "straight across" cutting movement slices a swath 24" deep, more than 72" wide. A new swing tongue adds even greater range to the unit's cutting ability by hydraulically telescoping and swinging the tongue — left or right — to allow pinpoint positioning without moving the vehicle. The machine is also available in a 36 hp unit. For more details, circle (702) on the reply card.



THE CRAWLER: Melnor Industries, Moonachie, N.J.

The Crawler, Melnor's newest traveling sprinkler, can pull up to 300 feet of ½" hose as it moves. It is precision engineered and designed with proper weight distribution so that the guide wheels hug the hose to keep it on course, regardless of the hose position. The Crawler has a 2 speed, 3 position control for fast, slow or stationary sprinkling. Ultra-wide spray arms are adjustable for variable sprinkling widths from 5 feet to 60 feet. Automatic shut-off is accomplished with Melnor's special shut-off valve, available for use with all Melnor traveling sprinklers. For more details, circle (703) on the reply card.

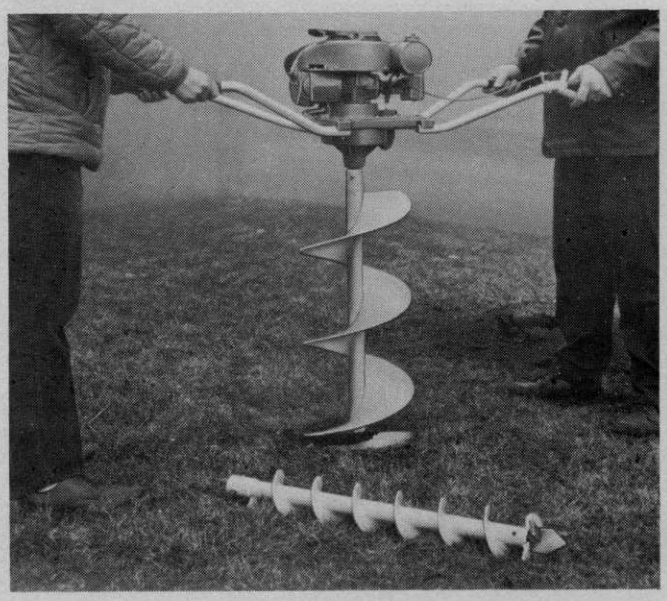


DEDOES AERATOR: Dedoes Industries, Berkley, Mich.

Here's a new turf maintenance system which makes two attachments do the work of four. Complete system includes an aerator unit which removes 180 plugs per revolution; an ingenious new 3-in-1 convert-a-unit which may be used as a roller; as a slicer (by attaching slicer plates); and as a spiker (by attaching spiker plates); the conversion unit utilizes the weight of the tractor for down force. A model is also available for use with smaller tractors. This unit takes a swath 42 inches wide and pulls 108 pluggers per revolution. For more details, circle (704) on the reply card.

LONG-REACH BOOM LOADER: New Holland, New Holland, Pa.

A new utility loader with the longest reach in its class and with a combination of hydrostatic drive and power steering is now available. Model L-35 has an SAE operating load of 1,800 pounds with rear weights. It features a boom system which extends the reach of the loader bucket as it rises higher. Included on the unit are a bucket level indicator, boom locks to keep the boom safely in the "up" position and an operator's cab built in as an integral part of the loader. It can turn in its own length. For more details, circle (705) on the reply card.

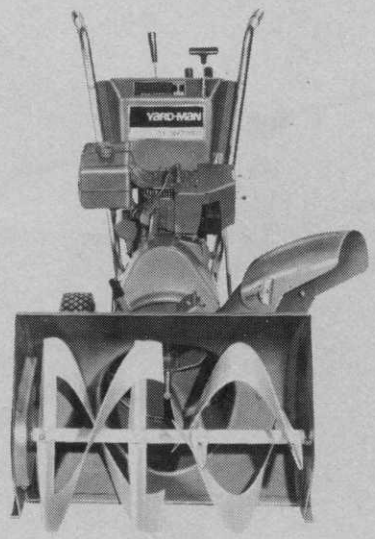


AUTO-DIG: Vogel Tool and Die Corp., Stone Park, Ill.

Auto-Dig is a new, low-cost, lightweight, portable power hole digger. Developed for heavy duty use. It has many excellent applications in landscaping, ranching, utility companies, and highway departments. The unit is equipped with a 5 hp, two cycle, air cooled engine and easy recoil starter. A dead man throttle control is mounted on easy-grip handlebars that are tilted to operate in a natural hand position. Vogel Auto-Dig is available in two models. For more details, circle (706) on the reply card.

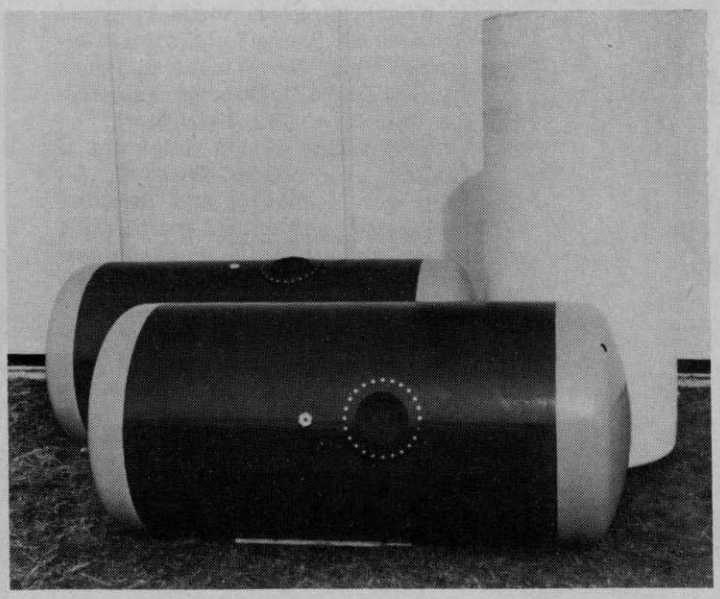
THREE POINT HITCH SPREADER-SEEDER: Ezee Flow, Coldwater, Ohio

Three-point hitch spinner spreader-seeder is designated the No. 106. Single spinner machine is designed to accurately and uniformly spread granular, pelleted and semi-granular fertilizers and most seeds, at rates ranging from 4 to 1,570 pounds per acre. Spread controlled from the tractor seat. Maximum effective spread width is 36 feet. Hopper, of 12-gauge formed steel, holds 690 pounds, or 8.5 bushels. Blades on spinner are adjustable, and shutters are nylon-faced. For more details, circle (707) on the reply card.



SNOWBIRD, YARD-MAN: The Leisure Group, Inc., Jackson, Mich.

Two new Snowbird® snowthrowers, a 5 horsepower, 24-inch model 7090 and the 7 horsepower, 26-inch model 7100 are now available. They feature 5 forward speeds plus reverse, a "Turret Action" discharge chute, and simplified controls. Both models are equipped with free-wheeling control which enables the release of power to the drive wheels while auger and impeller continue to run. They are powered by winterized Tecumseh 4 cycle engines with optional 110 volt electrical starting. For more details, circle (708) on the reply card.



FIBERGLASS TANK: Raven Industries, Sioux Falls, S. Dak.

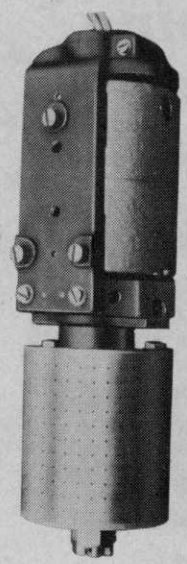
Seamless interior and centrifugally molded fiberglass are the features of this 60-inch diameter tank. The new tank can be used as a nurse tank or mounted on a truck applicator. It also can be used for stationary storage of chemicals. Tank size is available in 1000 to 1500 gallon capacities with a high strength to weight ratio. Can be mounted horizontally or vertically. It has 16 inch access opening with 10 inch fill well. Baffles and sump are features of the new tank. For more details, circle (709) on the reply card.

ELPHANT-VAC: Heath International, Inc., Richmond, Mich.

Mechanized mobile vacuum unit is capable of sucking up to eight 60 gallon bags of debris per hour. Capable of doing the work of five to eight men, depending on the density and type of debris, the unit will snatch up broken glass, bottles, cans, cups, paper, twigs, leaves, anything reasonably light and capable of fitting through Elphant-Vac's 8-inch diameter snout-like hose. Compact in design (only 9 feet long and weighing 920 pounds) this unit was designed to work in difficult, highly restricted debris ridden areas. Full production is expected to begin in January 1972. For more details, circle (710) on the reply card.

SELF-PROPELLED MOWER WITH FRONT WHEEL DRIVE: Bunton Co., Louisville, Ky.

Front wheel drive with extra large (10 x 2.75) wheels makes this 22 inch unit maneuverable and easy to handle in rough terrain. No engaging or disengaging clutches, for trimming around shrubs, trees and the hard to get areas. Special quick-type commercial height adjustment allows a quick change in cutting height. A deeper aluminum alloy frame permits even discharge of grass clippings into an optional grass catcher. Equipped with 4 hp engine, with 5 quart fuel tank and snorkel-type air cleaner mounted on handle. For more details, circle (711) on the reply card.



SPRAY SLEEVE: Beeco Products Co., Fort Washington, Pa.

Reduce application costs of wettable-powder and heavy-flowable fungicides with a new sleeve of perforated metal and the BEECO-MIST Model 275 spray head. It permits low-volume applications through controlled, uniform droplets of 80 to 100 microns. Fungicides are sprayed at the rate of 9 gallons per minute either from the ground or from an aircraft. For more details, circle (712) on the reply card.

Keith D. Law, Secretary, Minnesota Association of Nurserymen, represents that group and the Greater Minneapolis Chamber of Commerce in the presentation of ten 12-foot crabapple trees to the Kennedy Center for the Performing Arts, Washington, D.C. Seen with Law are (Left to Right) Mrs. Polk Guest, Chairman, Friends of the Kennedy Center; Mrs. Paul Hoyst, Trustee of the Kennedy Center; and Mrs. Lee Corcoran, President, Minnesota State Society.

Keeping America Beautiful

The Pioneer Plant Food

Good for everything you grow. Roses, trees, shrubs, flowers, lawns, fruits, vegetables. Spark vigorous growth.

Just dissolve in water, then sprinkle or spray. Fast acting, speeds results, no burning. High analysis 23-19-17%.

The favorite of experts for years!

RA-PID-GRO

Ohio State Sponsors Short Course

The 43rd annual Ohio State University short course for arborists, turf management specialists, landscape contractors, and garden center operators and nurserymen will be held in Columbus, Ohio, Jan. 23-27. This course is held in conjunction with the annual meeting of the Ohio Nurserymen's Association, Inc., and the Ohio Chapter of the International Shade Tree Conference, Inc.

The program promises to bring new ideas, developments and techniques to the various industries. The opening day is devoted to arborists. An afternoon panel will discuss the topic, "Tree Moving — Equipment, Methods, Early Maintenance, and Practices I Have Found Successful." Panel Moderator is Dr. L. C. Chadwick, secretary, Ohio Chapter I.S.T.C.

Panel members are: H. M. Van Wormer, president, I.S.T.C.; F. L. Dinsmore Tree Service, St. Louis, Missouri; Edwin E. Irish, Chas. F. Irish Co., Inc., Warren, Michigan; James T. Cates, City Arborist, Richmond, Virginia; and, William Thornton, Thornton Environmental Industries, Inc., Cincinnati, Ohio.

The morning program the next day will be chaired by Henry Gilbertson, president, Ohio Chapter, I.S.T.C. Speakers include Dr. Charles L. Wilson, director, Shade Tree and Ornamental Plants Laboratory, Delaware, Ohio, Dr. Winand K. Hock and Dr. Bruce R. Roberts, also from the Delaware, Ohio Laboratory.

The Tuesday session is devoted to landscape contractors. Speakers will deal with preparing and handling nursery stock to extend the planting season, the landscape architect and the contractor, residential landscape design for the 70's, and color and texture in the landscape.

Garden center operators will hear Dr. Vernon Vandermark, extension specialist in marketing, OSU, Wednesday on the topic, "Up-date Your Sales Techniques for Increased Sales and Profits." Extension plant pathologist, Dr. Robert Partyka, at OSU will also speak on "Can You Answer Your Customer's Plant Problems?"

Infrared Holds Promise For Turfgrass

Aerial infrared photography could become a quick and efficient tool in turfgrass management. That's what Robert L. Fleming of Environmental Surveys, Inc., a California based firm, told members of the 26th annual Turfgrass Conference at Texas A & M University in early December.

Fleming reported that surveys not only detect plant vitality but can show irrigation efficiency and loss of plant vigor before serious damage occurs.

Infrared filming saves time, he reported. It locates sub-surface rock conditions, moisture movement, sprinkling profiles and soil types. He cited a number of uses of infrared aerial photography. One was the problem of finding soil deep enough to reforest a mountain side. Infrared detected streaks of soil that would take the trees.

Possibly the most interesting and promising project underway, Fleming said, is a survey of 12,000 to 15,000 acres in California to determine the most likely place to tap tremendous steam resources 3,000 to 8,000 feet below the ground surface.

Such steam fields offer an almost unlimited source of power for electricity generation, he said.

About 300 persons in turf management from Texas and other states attended the two-day conference. Sponsors were the Texas Turfgrass Association and A & M University.

For More Details Circle (104) on Reply Card

The Vegetation Management Kit consists of a program sheet, a management guide, a brochure and folders.

Kit Aims at Cutting Weed Control Corners

How much growing energy of trees and turf and productive energy of man are being sapped by man's natural enemy, weeds?

Probably more than one generally realizes without making a careful analysis of the weed problem. The man assigned the weed control task has to make time, effort and money his targets for cutting. And the road to accomplishing that is careful planning of weed control methods before the heavy weed season begins.

That's why Geigy Agricultural Chemicals has produced a Vegetation Management Kit, designed especially to help make the job of weed control easier.

The kit is helpful in defining objectives, arriving at solutions and evaluating results and costs of weed control. There is no charge for the kit. It utilizes a large fold-out analysis spread sheet to be filled in by the weed control specialist. This chart helps in considering such planning factors as timing, safety and budget in the control of weeds.

Identifying the problem is the first step toward effective vegetation management. Describing the weedy area and determining major annual and other weeds to be controlled follows closely in any weed control program.

The analysis form helps in considering such essential safety factors as adjacent vegetation, trees, crops and lawns and considering potential hazards of runoff into adjacent waterways and channels.

Soil conditions, texture, organic matter and permeability are other factors to be dealt with. Equipment needed and available for vegetation control also must be determined.

After these and other determinations are made, the weed expert should be at the point of deciding on the best solution to the problem.

Mechanical control is broken into considerations as to what equipment to use, where it will be feasible to use it and when it should be used.

And chemical control is examined in detail. A choice must be made as to products to use: $elective, nonselective or brush. Rate of application must be determined. Deciding on the area to be covered leads to the final measurement of total investment.

For future use, the kit includes a special card for record keeping by area and a place for an evaluation of how well the objectives were realized, costs of both mechanical and chemical controls used, and, finally, a list of improvements that should be made in the next year's program. It also contains a booklet, "The Natural Enemy of Man, Weeds," that illustrates many hazards of weeds, including some seldom thought of.

The kit is available from Geigy distributors and salesmen or by writing CIBA-GEIGY Corporation, Ardsley, N.Y. 10502.

Coming For February Giant Golf Care Issue

safely lifts riding mowers up to 80" for quick and easy servicing

G&H Uni-LIFT

motorized all-position stand for walking mowers also available

Dependable hydraulic power safely lifts 1000 lb. loads to any working height up to 80"—in less than 30 seconds. Operator faces lifting action—reaches all controls without moving. Runways are 72" long and are adjustable in width from 17" to 46". No permanent installation required. Write today.
G & H Products, Inc., Dept. WT
St. Paris, Ohio 43072

For More Details Circle (120) on Reply Card

Elanco Field Tests New Pre-Plant Herbicides

Elanco Products Company, Indianapolis, Ind., has field tested a new method for applying Treflan and Balan to cut operational costs. It consists of utilizing a dry bulk fertilizer which has been impregnated or coated with one of these two preplant herbicides.

Field tests conducted by fertilizer companies in cooperation with Elanco utilizing these fertilizer-herbicide combinations have demonstrated weed control results equal to the application of Treflan and Balan in water.

Any blending system which will assure uniform distribution of the herbicides onto the fertilizer can be utilized. This coating process has been accomplished successfully with closed drums, mixers and ribbon blenders.

All label recommendations for Treflan and Balan regarding rates of application per acre, incorporation, approved crops, other label directions and cautions apply and must be followed. In addition, bulk fertilizers coated with Treflan or Balan must be applied immediately.

The recommended rates of Treflan or Balan per acre must be applied on the fertilizer mixture, which in turn will be applied at a rate between a minimum of 250 pounds per acre and a maximum of 450 pounds per acre.

Fertilizer blends containing limestone or urea should not be used. An approved list of dry fertilizer ingredients is available from bulk fertilizer suppliers.

New Brochure

A new brochure, "Planning A Golf Course?" has just been released by the Golf Course Builders of America.

The leaflet, designed especially for persons or organizations contemplating construction of a golf course, identifies the national sources for information about the golf industry and course construction. It also highlights points prospective golf course owners should consider before starting construction.

The publication is available at no cost by writing Golf Course Builders of America, 632 Shoreham Building, Washington, D.C. 20005.

WEEDS TREES and TURF
for March
Weed Control Issue

Helicopters Fertilize 60,000 Acres of Trees

Among the most extensive short-term fertilizer applications was recently completed on 60,000 acres of trees in Oregon.

Evergreen Helicopters, Inc., applied more than 10,000 tons of granular fertilizer near Eugene, and near Longview, Centralia, and Raymond, Wash. The job was done for the Weyerhauser Company as part of its timber management program.

About 90 percent of the trees were Douglas fir and the balance were hemlock, all from 25 to 80 years of age.

Carl Milko operations manager said the first 50,000 acres were covered in about 30 working days this fall using four helicopters — one in each area—and Evergreen's own patented underslung distribution systems. The final portion of the job was done by a single helicopter during November.

Flying hours reached a maximum of seven per day, depending on factors such as winds, fog and rain. Rate of fertilization, with all four copters in operation, was as high as 35 tons per hour. Much of the area covered in the operation is terrain that would greatly reduce the mobility of ground crews.

Evergreen's dispersal units carry about 3,200 pounds of fertilizer per trip and have a gross weight of approximately 4,000 pounds, easily accommodated by the medium-size turbine 205A's. Each system is driven by a Volkswagen engine and is electrically controlled from the helicopter cockpit.

Weyerhauser has three helicopters of its own, but the company periodically contracts with commercial operators for sizeable numbers of additional units for its continuing research programs to improve survivability and yield of timberlands.

New Owner For Jari Sickle Mower Line

The Year-A-Round Cab Corporation, Mankato, Minn., has announced that, as new owner, parts as well as new equipment will be ready to Jari sickle mower users.

The company recently purchased the line and will manufacture two models with sickle sizes ranging from 16 to 60 inches.

1972 Turf and Landscape Horticulture Institute

The University of California Agricultural Extension Service and the Southern California Turfgrass Council, in cooperation with other environmental landscape organizations, will present the 1972 Turf and Landscape Horticulture Institute on March 21 and 22, 1972. It will be at the University of California Irvine Campus.

The two-day Institute (formerly known as the May Turfgrass Institute) is an educational event designed for landscape architects of turfgrass and other ornamental plant material.

The Institute will feature well-known speakers who have made a valuable contribution to the environmental landscape industry.

Further details regarding this major educational event can be obtained by directing your inquiry to Dr. Victor A. Gibeault, Extension Turf and Landscape Horticulture Specialist, 1145 Batchelor Hall, University of California, Riverside, Calif. 92502.

Republic Rubber Drops Some Product Lines

The Republic Rubber Division of Aeroquip Corporation at Youngstown, Ohio, has announced that it will discontinue a number of product lines.

Lloyd C. Preston, vice president and general manager of the division, stated that present economic conditions have aggravated the competitive situation on certain marginal lines. The products to be discontinued include conveyor and transmission belting, sheet packing, and some types of hose. Manufacture of these products will be phased out during the first quarter of 1972, Preston said.

He explained that high costs and the inability to obtain price relief because of the competitive situation led to the decision to drop the product lines. Age and condition of the production facilities were also contributing factors.

Discontinuing these marginal lines, Preston added, will permit the division to devote more resources and management direction to the major product lines. Republic will continue to manufacture horizontal braided and loomed hoses, molded rubber goods, and lathe cut rubber products.

industry people on the move

LOREN E. HILL, named general manager of Davis Manufacturing, Division of J. I. Case Company. He replaces Charles Davis who resigned December 31.

* * *

RUDOLF GRUN, elected to board of directors, Amchem Products, Inc. Announcement made by Eugene A. Snyder, Amchem President.

* * *

JIM BATTEN, promoted to branch manager, Thompson-Hayward, Newark Chemical Distribution Center. He will head up marketing efforts in Delmarva and surrounding areas.

* * *

KNUD H. HOFFMEYER, to chief engineer, Turf and Commercial Products, Jacobsen Manufacturing Company, Racine. Hoffmeyer succeeds Donald Haffner who was promoted to manager, Product Engineering.

* * *

JOHN J. MADDEN, named national sales manager, Melnor Industries, a division of Beatrice Foods Company.

* * *

JOHN C. CARRINGTON, Maurice F. Dufour and Forbes K. Wilson, all elected senior vice presidents of Freeport Minerals Company. Each of the new officers serves as president of a Freeport division or subsidiary.

* * *

HARVEY L. SLADE, joined Bolens Division of FMC Corporation in Port Washington, Wis. as assistant to division manager, David Hill.

DR. JOHN R. HALL, III is the new extension turfgrass management specialist at the University of Maryland. His father is a retired golf course superintendent at the Pekin, Ill. country club. His grandfather was a former president of the Professional Golfers Association in Ohio.

* * *

ROB R. SMITH, appointed national sales distributor for Robco, Inc,. Burlingame, Calif. Smith is owner of Equipment Sales and Service Company, San Jose.

* * *

JOSEPH P. BARKER, appointed plant manager of Scott Aviation's Charlottesville, Va., plant. Formerly he was marketing manager for the Davis Instrument line at Scott Aviation.

* * *

LUTHER L. SCHOEN, joins sales team of NOR-AM Products, Inc. for New York and Pennsylvania territory; from Bechtel Corporation, Plymouth, Mass.

* * *

C. LESLIE McCOMBS, to head of Horticulture Department at Virginia Tech, Blacksburg, Va., from North Carolina State University.

* * *

ROBERT G. McMASTER, named marketing manager, Concrete Machinery Division, J. I. Case Co; he has been with Case since 1957.

* * *

JAMES L. JOPLIN, to sales engineer, Commercial and Turf Products, for Jacobsen; from Velsicol Chemical Corp. New territory is Arkansas, Kansas, Oklahoma, Missouri, and Texas.

* * *

WILLIAM COPENHAVER, named executive vice-president of Columbia Nitrogen Corporation, Augusta, Ga.; from position of president, Canadian Celanese Corp.

Stop Erosion with Ground Cover Product

A new soil erosion control ground cover product that prevents erosion and speeds seed germination and grass growth on landscaping projects has been developed by Swift Textiles, Inc.

Called Swif-Gro, the product does a good job when stapled down over seeded areas, and also works well over sprigs. The material enables a contractor to get grass quickly without soil erosion.

Swif-Gro is an all cotton woven mesh fabric laminated to cellulose tissue mulch. The material is packed in 500 yard 170 pound rolls 75" wide which makes it easy to handle. It lets needed moisture in while the excess water runs off thereby preventing erosion. Once grass starts coming up the tissue disintegrates. It is not necessary to remove the material.

Check Electric Motors Regularly

Electric motor maintenance is important in assuring long service.

Many motors, such as those on fans and pumps of heating and ventilating systems, have logged numerous hours of operation with dirty, wet and cold surroundings. It'll pay you to inspect these motors and clean the moisture, grease, and other dirt from them, advises William R. Schnug, extension agricultural engineer at The Ohio State University.

Cleaning procedures vary. A totally enclosed motor needs only the outside frame wiped clean. Open-type motors require both inside and outside cleaning. A strong vacuum cleaner will usually be adequate in cleaning the interior of the motor. Compressed air can also be used to blow dirt from the motor windings. Avoid excessive air blast that may embed dirt and metal particles, warns Schnug.

If a motor is exceptionally dirty, it must be dismantled, cleaned and re-assembled.

Large motors may have grease-lubricated bearings. Those with a drain plug should be greased until a small amount of fresh grease emerges from the drain. If there is no drain, a few pumps of a good quality grease every six months is usually enough lubrication.

Avoid over-lubrication of bronze sleeve bearings. A few drops of #10 oil every 5-6 months is sufficient.

Supply conductor breakdowns result in electrical failures. Schnug advises checking for cracked cords, loose or worn box connectors and loose connections at motor terminals.

YOUR LAWN: HOW TO MAKE IT AND KEEP IT by R. Milton Carleton. 127 pages, illustrated. Retail price: $7.95.

About the Author: R. Milton Carleton is well-known as an author of books on gardening and as an editor of the periodical, **Chicago Today.** He has also pioneered in studies of new turf varieties and preemergence crabgrass controls. He is currently investigating the effects of artificial light and soil substitutes on plant growth.

About the Book: Your lawn consists of 14 chapters. Early in the book he answers the question, what is a lawn good for, by detailing the esthetic and environmental values. Chapter headings on drainage and grade and soil follow next. The next section deals with arriving at and maintaining a good nutritional balance. This is followed by a chapter on the importance of pH. Chapters 6-10 cover grass varieties, starting and maintaining your lawn, places where grass does not thrive, renovation, and rough lawns, respectively. The balance of the book involves discussions on pests—on and in the turf, weed control, lawn diseases and mechanical equipment. The book is well-written and easy to read. Maps and line drawings are interspersed throughout the book.

WEED CONTROL *(from page 16)*

decomposition by ultraviolet light has been suggested as an additional factor.

RESIDUES: The actual amount of herbicides in the environment has been studied in numerous monitoring surveys throughout the United States. We know, of course, that treated soils and waters contain herbicides for some period after treatment; otherwise we would not have weed control. Our concern is with the possibility of appreciable residues for long periods after treatment or the occurrence of herbicide residues in untreated or non-target sites.

Since residues are reported in terms of concentration — parts per million (ppm), parts per billion (ppb) and even parts per trillion (ppt)—it is important to recognize what these figures actually mean. The amount of soil covering an acre, one foot deep (usually called an acre foot of soil) weights about 3½ million pounds. Thus if we apply 3½ lbs. per acre of an herbicide and mix it throughout the upper foot of soil, the concentration will be 1 ppm. If we mix it only in the top 6 inches of soil the concentration will be higher — 2 ppm. It is the same amount of herbicide but mixed in less soil.

If we are concerned with water we should remember that water weighs 62.4 pounds per cubic foot and 8.33 pounds per gallon. Thus an acre foot of water (enough to cover an acre one foot deep) weighs about 2.7 million pounds and an herbicide application of 2.7 lbs. to an acre foot of water gives a concentration of 1 ppm. In terms of gallons, 8.33 pounds of herbicide are required to give a concentration of 1 ppm in a million gallons of water.

Some concept of the minuteness of 1 ppb can be obtained from a consideration of the population of the whole earth which is between 3 and 4 billion people. Thus 3 or 4 people represent 1 ppb of all the people on the earth today. Residue concentrations need interpretation in terms of amounts as well as concentrations!

Residues in soils have been monitored for some time. A detailed study in six areas over several years revealed only minor amounts of phenoxy herbicides. Out of 264 samples only 4 contained 2,4-D with an average concentration of 0.032 ppm. None contained 2,4,5-T. In none of these surveys has there been evidence of excessive accumulation of any herbicide in the soil environment.

Residues in water have likewise shown no evidence of accumulation. A monthly survey of 11 major streams in the Western U.S. in 1967 revealed no residues of 2,4-D, 2,4,5-T or silvex. A U.S. Geological Survey of 20 sites on Western streams using refined analytical methods showed only fractional parts per billion of 2,4-D, 2,4,5-T and silvex in a limited number of the several hundred samples analyzed. Again, there is no evidence of accumulation of phenoxy herbicides in any of the studies.

Residue data in plants are required for registration and breakdown curves and total amounts of residues are the bases for the tolerances set. There are pages of such data in every petition for a tolerance. Spot checks by regulatory agencies rarely reveal residues in crop plants in excess of established tolerance when the use pattern has followed label restrictions. There is no evidence of excessive herbicide residues in any of our food stuffs.

Residues in animal products have also been monitored. In 1969, the Consumer and Marketing Service, USDA, analyzed 240 samples of red meat fatty tissue from 44 locations across the U.S. for 2,4-D. More than 96% showed no residue, with only 3 samples showing more than 0.10 ppm and none as much as 1 ppm. There is also no evidence of accumulation in milk even when 2,4-D was fed directly to lacating cows.

Resides in the air have had only limited study, but as indicated earlier, drift or volatility may result in air contamination for brief periods. Usually the effects are evidenced on neighboring vegetation and rapidly diminish with distance.

EFFECTS ON ORGANISMS: An extensive bibliography on toxic effects of herbicides to a wide variety of organisms was published by the National Agricultural Library in 1968 and many publications cover effects of specific herbicides on specific organisms. Even extensive use of herbicides has produced changes in only limited areas and I know of no plant species that has been eliminated through the use of herbicides.

The majority of current herbicides must be fed in large quantity to produce any toxic symptoms. Extensive feeding tests are run on all herbicides prior to registration and the hazards, if any, are known. At normal rates of application our current widely used herbicides appear to have no direct effects on wildlife or farm animals. Residues have not appeared in milk or eggs. There is no evidence of wildlife destruction although changes in cover and possibly food plants on limited areas have caused population movements to other untreated areas.

For man, the only toxic effects have been from the direct ingestion of herbicides for intended suicide or accidental ingestion by children as the result of adult carelessness.

There is no evidence that the use of herbicides today contributes to deterioration of our environment.

classifieds

When answering ads where box number only is given, please address as follows: Box number, c/o Weeds Trees and Turf, 9800 Detroit Ave., Cleveland, Ohio 44102.

Rates: "Position Wanted" 10¢ per word, minimum $3.00. All other classifications 20¢ per word, minimum $4.00. All classified ads must be received by Publisher the 10th of the month preceding publication date and be accompanied by cash or money order covering full payment. Boldface rule box: $25.00 per column inch.

HELP WANTED

LARGE PROGRESSIVE TREE service company is interested in employing a man capable of assuming the direction of tree, lawn, and garden service to individuals. We are presently engaged in this activity but wish to expand this phase of our service. We can offer a good salary with the opportunity of a bonus, pleasant working conditions, and the normal benefits. We also have an excellent hospital, accident, and life group plan. Write Box 72, Weeds Trees and Turf, 9800 Detroit Ave., Cleveland, Ohio 44102.

GENERAL FOREMAN — For Tree Service Company, Rochester, New York, 14623. Experienced, active and imaginative person to organize and supervise 8-12 Tree Service crews, (approximately 85 men). Must have proven background to lead and inspire men to work efficiently. Knowledge of tree work helpful—but not essential. Year-around salaried position. Company vehicle furnished. Hospital and Pension Benefits. Reply to: Mr. F. R. Micha, Monroe Tree-Landscape, 225 Ballantyne Road, Phone: 716 436-2900.

EXPANDING tree service company in northeast—looking for aggressive and experienced salesman. Starting pay commensurate with education, experience, and ability. Commission also paid on profits earned. Company car furnished; pension plan; paid hospitalization, excellent future. Send resume (with current annual sales and earnings) to Box 73, Weeds Trees and Turf, 9800 Detroit Ave., Cleveland, Ohio 44102.

USED EQUIPMENT

1968 FORD PICKUP and camper, $2,400. Pickup, $1,500. I.H.C. Twin Screw tractor, $2,500. Roseman 7-gang mower, $1,000. 13-gang Roseman, $2,000. Ryan 18" sod cutters with roll Ryder attachment, $450. to $900. 6000 lbs. Towmotor fork lift, $2,300. I.H.C. 350 fork lift, $1,950. Pellets 32 x 48, $1.00 each. H. G. Oliver crawler $550. Ellis Foulkes, Fall River, Wis. 53932.

RECONDITIONED brush chippers, sprayers, log splitters, stump routers, bucket trucks. Let us know your needs. Equipment Sales Company, 5620 Old Sunrise Highway, Massapequa, New York 11758. Phone 516 799-7619.

FOR SALE: 1—1971 Finn Batam-8 (800 gallon) hydro seeder, trailer mounted, $3,900.00! Call or write A. D. Rusin Landscaping, Inc., 340 North Drive, Lorain, Ohio 44053. Phone (216) 233-8217.

1968 ASPLUNDH 16" 8 cylinder Chipper, $3400.00; 1968 5T Alenco Crane with 60' boom extension on Ford Chassis, $10,500.00. Ohio Chipper & Equipment Co., Mentor, Ohio 44060. Phone 216 255-4355.

FOR SALE: New Arps stump chipper, never used, has new shock drive line, three-point hitch mount. Will sacrifice $1,750. Phone 319 233-8589 Waterloo, Iowa.

ASPLUNDH 12" Chipper 4-cylinder, Waukeshaw, Works good, $1500.00. Bill's Power Equipment, 1818 Algoma Blvd., Oshkosh, Wisc. 54901.

FOR SALE

DOUBLE EDGE sod cutter blades. Will fit any Ryan sod cutter. Works like double edge razor blade. Cuts much more sod per blade. Made to bolt on both ways. $24.00 plus postage. New automatic sod loaders for direct loading to pallets, trucks or trailers. No workers needed on ground. Both products developed and designed by Hadfield. Write or call Glen Hadfield, 4643 Sherwood, Oxford, Michigan 48051. Phone 313 628-2000.

SPRAY AND TREE SERVICE—Illness forces sale of fast growing but stable business. Regular four time per year customer route. Very modern equipment. $34,500.00, terms. Write: George DesBrisay, 333 American Bank Bldg., Portland, Oregon 97201.

EDUCATION — BOOKS

AUTOMATIC IRRIGATION Correspondence Course. Keep up to date with latest developments in all types of automatic irrigation equipment and systems with low cost ten lesson course. Easy to follow text and diagrams on valves, heads, controllers, pipe, central control. Special lessons on irrigation hydraulics, design, maintenance, soil moisture measurement and sensing, water quality, corrosion. Course is written and given by men in the landscape industry. Send for free course outline and information: Larson Company, ' P.O. Box 4453, Santa Barbara, California 93103.

SEEDS

SOD QUALITY MERION SEED for discriminating growers. Also Fylking, Delta, Park, Newport, Nugget and Pennstar bluegrasses as well as fine fescues. We will custom mix to your specifications. Michigan State Seed Company, Grand Ledge, Michigan 48837.

MISCELLANEOUS

TREE APPRAISALS AND SURVEYS: For names of members of American Society of Consulting Arborists, Inc., nearest you, contact: Executive Director, ASCA, 12 Lakeview Avenue, Milltown, N.J. 08850.

HERBICIDE SALES AND MARKET DEVELOPMENT

Chemical Division of a major Corporation needs a well qualified person to sell sterilant herbicide products to the railroad and industrial markets.

The person we seek must have railroad herbicide experience and solid knowledge of the applicator segment of the industry.

Major emphasis on sales with some demonstration work required.

Submit resume in strictest confidence to:

BOX 76, WEEDS TREES and TURF
9800 Detroit Avenue
CLEVELAND, OHIO 44102
An Equal Opportunity Employer

FOREST PROTECTION SPECIALIST

The Agricultural Division of Abbott, an established leader in the production and marketing of biological (not chemical) insect control agents, is expanding into the shadetree and forest market.

The Product: DIPEL, a naturally occurring bacterium specifically toxic to most species of leaf-eating worms, but harmless to all other elements of the environment. Wide acceptance by commercial vegetable growers and extensive tests on such tree pests as gypsy moth and cankerworm indicate excellent market development opportunities.

The Challenge: Work with State and Federal authorities, arborists, distributors, municipalities, and ecology groups to establish field evaluations throughout 4 northeastern states; lay a sound foundation for future full-scale sales; grow with this special-use market as you shape its expansion nationwide and overseas.

The Man: Will have had active involvement in sales and/or development programs in which he played a direct role in educating and motivating diverse groups. Must be an effective and creative communicator. Prefer experience in forestry, entomology and/or ag chemicals.

Rush resume and salary history in confidence to:

JOHN GADDIS
Professional Employment

An Equal Opportunity Employer M/F

ABBOTT
Health Care World Wide
NORTH CHICAGO, ILL. 60064

Trimmings

GREEN GRASS IS HAPPINESS according to a recent poll conducted by the Agricultural Research Service. Among 26 things people were asked to consider important to their happiness, 95 percent chose green grass and trees. Next were good neighbors, modern kitchens, nearby shopping areas or good schools.

HERBICIDE IN A GLOVE is the latest development to be tested. A garden glove which contains herbicide in a cavity in the palm is being tried by John Holroyd, principal scientific officer at the Agricultural Research Council's Weed Research Organization in Oxford, England. The user "strokes" the weeds thereby distributing a lethal dose of herbicide. It may be the next best thing to pulling them.

ANOTHER BRITISH INNOVATION has surfaced for areas of eroded waste land. It's a new soil stabilizing process that helps germination of sown seeds or grasses. Called Unisol 91, this soil stablizing product is a permeable film made from a synthetic rubber ingredient. After preparing soil, spray it on and Unisol 91 will last up to eight months. British manufacturer is looking for U. S. companies interested in making the product. Synthetic rubber may possibly have off- as well as on-the-road use.

THE AGE OF MOBILITY is certainly upon us. Federal Highway Administrator F. C. Turner says we traveled 1,170 billion vehicle miles in 1971. Miles per vehicle per year is now above 10,000. Miles traveled per gallon is dropping, however. Now down to 12.14. Ten states accounted for nearly 53 percent of all the travel in the U.S. In order they are: California, New York, Texas, Pennsylvania, Ohio, Illinois, Michigan, Florida, New Jersey, and Indiana. These represent large population centers or recreational areas.

DUTCH ELM DISEASE is a threat, a problem, an expense and a hazard. Dead elms awaiting removal can be a hazard to passersby if they should fall on them. Not so ridiculous as evidenced by the death of a young boy in Kansas City recently. He was crushed by a crashing dead elm standing adjacent to a sidewalk. Science is working hard on a cure, but dead elms represent many tons of wood standing vertically waiting for a place to fall.

FUNGUS KILLS WITCHWEED is a different twist. Low quantities of the fungus Sclerotium rolfsii infect witchweed at the base of the plant and cause it to topple over. Witchweed invades many grass areas and attaches itself to the roots of the host plant where it lives as a parasite. In tests, the fungus killed every witchweed plant, seed and seedling. While it appears to be an answer to some, others like peanut farmers still regard this fungus as a threat. They call it southern blight.

NUMBER ONE IN AGRICULTURAL DAMAGE in the U.S. annually is insects. They cause an estimated $4 billion in losses. Plant disease accounts for $2.7 billion, followed by weeds at $500 million and rodent damage at $500 million. If man is to survive, he must use all tools, materials, machines and methods to protect his crops and himself against agricultural pests. Without crop protection the U.S. farmer could not have more than doubled the agricultural production from 1955 to 1970.

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From the Pennsylvania Turfgrass Council, Inc. Newsletter, The Keynoter, November 1971.

A GRASS ROOTS VIEW OF PESTICIDES

by Dr. Herbert Cole, Chairman, Pennsylvania Turfgrass Council Pesticide Committee

What can a practical golf course superintendent or owner of a landscape service do about the (pesticide) situation?

Take a positive attitude with golf club management, members, and customers. Determine from attendance at meetings, personal reading, and other sources which pesticides will do the job with the least hazard to people or the environment. Use these materials and tell people that you are using these materials and are planning pest control programs with the view of preventing side effect damage. Tell the club greens committee, the members, or your landscape service customers what you're attempting to do. If you use a non-hazardous material that costs more maybe of somewhat lesser effectiveness tell them this is a positive vein. Grumbling and apologizing will create disdain; a forthright positive approach will create respect. More people are concerned with pollution and the quality of our earthy environment than you have ever realized. People will pay for the high priced material or live with a few insects if they understand the situation. Become competent and knowledgeable; pest control is really population management, you are an applied ecologist. Turf management is also applied ecology involving the management of various grass and other plant species so that the desired species predominates over a long term.

Rise above the attitude of the novice who attempts to eliminate every last plant pathogen or every last insect or "weed" plant. Obtain realistic goals of pest suppression and population management. Push for research support for integrated pest management systems including genetically diverse lines of turfgrass and other plant species.

View pest control as part of total turf or landscape management rather than part of a pill oriented society that takes pills to sleep, pills to wake up, pills to eat, pills to stimulate grass, pills to stop grass and pills to cure grass of all its ills.

For More Details on the Following Page Circle (112) on Reply Card
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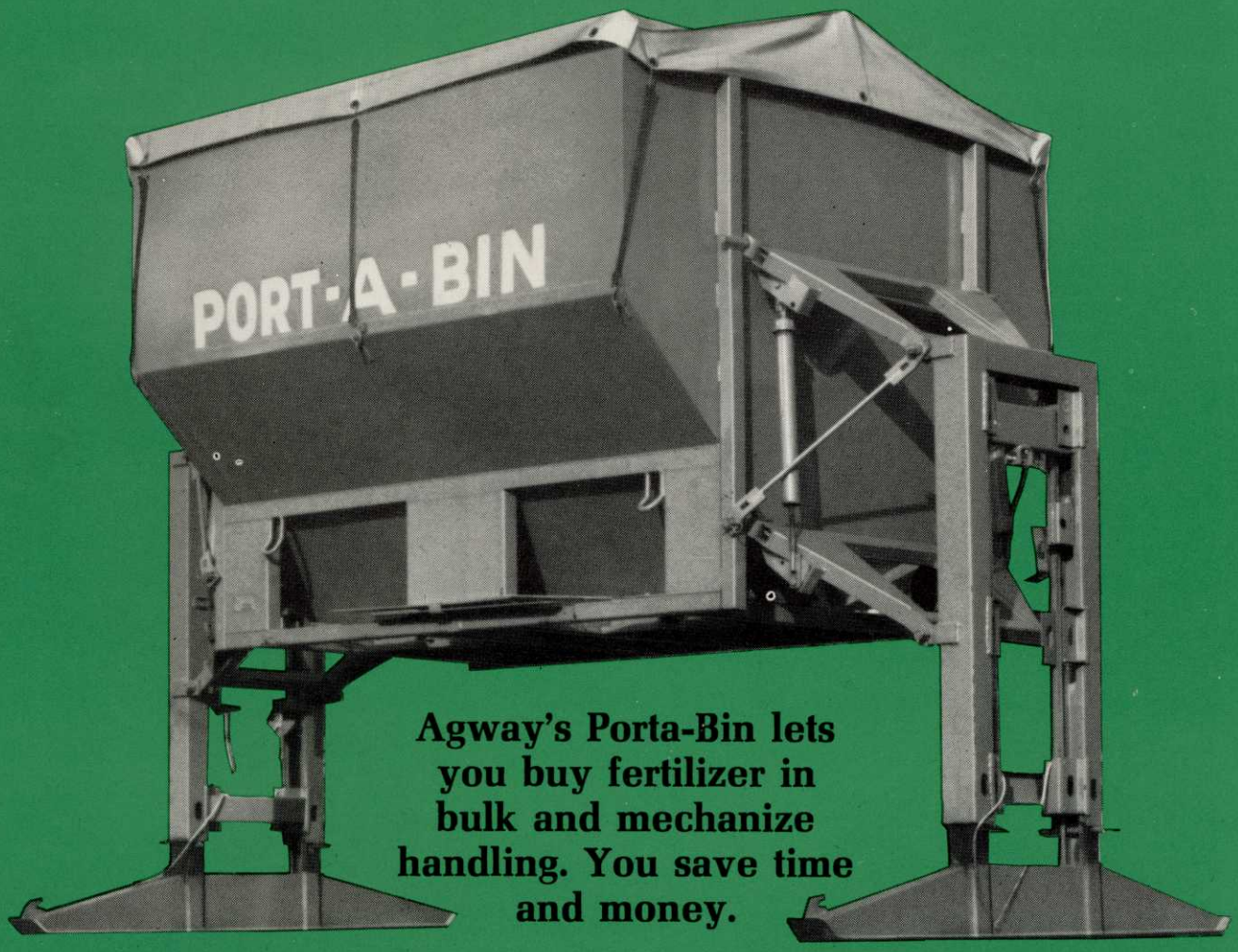
Ease the budget squeeze.



Agway's Porta-Bin lets you buy fertilizer in bulk and mechanize handling. You save time and money.

In less than ten minutes, an Agway Porta-Bin, preloaded with four tons of fertilizer, is set up at your site, ready to load out. The Porta-Bin lets one man load fertilizer into your spreaders or planters in a matter of seconds.

The Porta-Bin eliminates bottlenecks. Keeps your men and equipment on the job instead of waiting in line for fertilizer.

The Porta-Bin is a good investment . . . and so are the other things that your Agway Turf Man can provide. Like seeds, chemicals, tools, fencing, buildings, plus all the special services described below.

For complete details, write: A. J. Wells, Manager, Commercial Sales, Agway Inc., Syracuse, N.Y. 13201. Or call him collect: 315-477-6112.

Assistance in planning a care and maintenance program. Plus a 24-hour hot-line telephone recall system that gets you answers fast.

Best solutions to pest-, weed-, and disease-control problems. The most complete line of turf foods and maintenance aids, including Kapco fertilizers, a new addition to the Agway line.

One man.
One billing.
One responsible grounds maintenance specialist.

AGWAY

Introducing Maintain® CF 125. It will make your grass grow so slowly you'll think it's cutting itself.

MAINTAIN is the latest improvement in vegetation control. An effective plant growth retardant that will make your grass grow lush and green and very very slowly.

Meanwhile, MAINTAIN will be speeding up your maintenance program. It will save you time and money because it will save you mowings. You may not have to mow more than once or twice a season. If that.

MAINTAIN won't cost you more than it will save either. It will plug right into your present maintenance program. Only it'll make everything run more smoothly and efficiently and economically.

For one thing, MAINTAIN controls broadleaf weeds while it retards grass growth. And for another thing, it's applied in solution. Which means your men will have an easy time spraying where machines have a tough time mowing.

That kind of convenience could cut costs in some instances by as much as 75%.

And who knows? Maybe next summer you can even plan on taking a vacation.

U.S.BORAX®

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